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P. C. PANT.

BANARAS HINDU UNIVERSITY JOURNAL

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काशी हिन्दू विश्वविद्यालय के संस्थापक

पूज्य महामना

हिताय सर्वलोकानां निग्रहाय च दुष्कृतां
धर्मसंस्थापनार्थाय प्रणम्य परमेश्वरम् ।
प्रसादाद्विश्वनाथस्य काश्यां भागीरथीतटे
विश्वविद्यालयः श्रेष्ठः हिन्दूनां मानवर्धनः ॥
हिन्दूराज्याधिपतिभिर्धानिकैर्धार्मिकैस्तथा ।
मिलित्वा स्थापिते सद्भिर्विद्याधर्मविवृद्धये ॥

जन्म :—वि० सं० १९१८ पौषकृष्ण ८ (२५-१२-१८६१)
मोक्ष :—वि० सं० २००३ मार्गशीर्षकृष्ण ४ (१२-११-१९४६)

विषय-सूची

शुभाभिनन्दनम्

पं० विश्वनाथशास्त्री
अध्यक्षः धर्मविज्ञानविभागस्य

मन्दारो विदुषां श्रुतिस्मृतिजुषां सर्वातिशायी गुणैः।
विश्वाज्ञानहृतां यशोद्युतिभृतां सम्मानिनामग्रणीः॥
स्वार्थं संपरिहृत्य भद्रकरणेऽन्येषां सदा तत्परः।
श्रीमान् लालबहादुरो विजयते मन्त्रीप्रधानो महान्॥ १॥

पन्तस्यात्मा नेहरूस्त्वं द्वितीयो
धन्यो मान्यः श्रीपटेलोऽपरस्त्वम्॥
धर्मे दाढ्यं शूरता सत्स्वभावः।
लोके नित्यं त्वत्प्रसादाल्लसन्तु॥ २॥

कल्याणानां शतं त्वं वितर वसुमतीप्राणिवर्गेष्वजस्रम्।
देशे देशे विदेशे प्रसरतु सुयशः चन्द्रकर्पूरशुभ्रम्॥
आनन्दो मानवानामधिहृदयमहो सन्निधत्तां महात्मन्।
साम्राज्यं भारते ते भवतु चिरतरं विश्वनाथप्रसादात्॥ ३॥

मनमानी हिन्दी[1] (२)

डा० ब्रज मोहन
प्रिंसिपल, सेंट्रल हिन्दू कालेज

(११) दिल्ली परिवहन की बसों में आपको लिखा दिखाई पड़ेगा :

"दिए गए किराए के बदले में टिकट प्राप्त कर लीजिए।"

इस भाषा के पढ़ने से ऐसा मान होता है कि इसके नीचे कहीं पर किराए की तालिका दी हुई है, और निर्देश है कि "जो किराया नीचे दिया हुआ है, उसके बदले में टिकट ले लीजिए।" किन्तु लेखक महोदय ने बिना सोचे समझे निम्नलिखित अंग्रेजी वाक्य का शब्दानुवाद करके टाल दिया है :

"Have a ticket in exchange for fare given"

उपरोक्त हिन्दी के वाक्य का यह अर्थ कदापि नहीं निकलता। हिन्दी की प्रकृति के अनुसार इस अंग्रेजी वाक्य का अनुवाद होना चाहिए :

"किराया दीजिए और टिकट प्राप्त कीजिए।"

(१२) इंग्लैंड में यह सामान्य शिष्टाचार है कि जब किसी अपरिचित को सम्बोधित करते हैं तो "क्षमा कीजिए" से आरम्भ करते हैं। मान लीजिए कि आपको एक टिकट चाहिए। तो आप कहेंगे :

Excuse me; I want a ticket.

कुछ लोग इसी की देखा देखी हिन्दी में भी कहते हैं :

क्षमा कीजिए; एक टिकट चाहिए।

लोग यह भूल जाते हैं कि अंग्रेजी में Excuse me केवल एक शिष्टाचार का ढंग है। अतः इसका शब्दानुवाद नहीं करना चाहिए। हमारे देश के शिष्टाचार के अनुसार इतना कहना पर्याप्त है :

"कृपया एक टिकट दीजियेगा।"

केवल इतना ही नहीं; हमने तो इंग्लैंड से लौट हुए कुछ लोगों को इस प्रकार के वाक्यों का भी प्रयोग करते देखा है :

क्षमा कीजिए, आज मौसम तो बढ़िया है।

क्षमा कीजिए, दाल तो अच्छी बनी है।

क्षमा कीजिए, लड़का घर चला गया।

कोई इनसे पूछे कि अपराध कौन सा किया है जो क्षमा माँगी जा रही है ?

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[1] इस माला का पहला लेख प्रज्ञा IX (२), मार्च १९६४ में छपा था

(१३) हम यह मानते हैं कि हिन्दी के प्रचार में भारतीय सिनेमा ने बहुत सहायता की है। यह भी एक महत्वपूर्ण साधन है जिसके द्वारा बंगाल और दक्षिण में लाखों भारतीयों में हिन्दी फैल गई है। कलकत्ते में तो प्रति वर्ष सैंकड़ों हिन्दी फिल्में प्रदर्शित होती ही हैं, दक्षिण के बड़े नगरों में भी कुछ लोग बड़े चाव से हिन्दी फिल्में देखते हैं।

यह सब तो ठीक है किन्तु कुछ फिल्मों में भाषा की सुष्ठता पर ध्यान नहीं दिया जाता। फिल्म "काला पानी" में एक आगन्तुक किसी कार्यालय के एक फलक पर पहुँचता है जिस पर एक लड़की काम कर रही है। लड़की उससे कहती है,

"मैं आपके लिए क्या कर सकती हूँ ?"

हम यह मानते हैं कि यह वाक्य व्याकरण की दृष्टि से शुद्ध है। किन्तु बिल्कुल बेजान है क्योंकि हमारी संस्कृति के अनुकूल नहीं है। हमारे देश का शिष्टाचार तो यह है:

"मेरे योग्य कोई सेवा ?"

अथवा, "कहिए, क्या आज्ञा है ?"

लेखक महोदय ने, बिना हमारे शिष्टाचार की प्रकृति पर ध्यान दिए, अंग्रेजी के इस वाक्य का अनुवाद करके रख दिया है:

What can I do for you ?

(१४) हमने अंग्रेजी की यह कहावत पढ़ी है:

All that glitters is not gold

इसी के आधार पर फिल्म "बाप बेटे" में, लेखक महोदय ने एक पात्र के मुँह से यह वाक्य कहला दिया है:

"हरेक चीज़ जो चमकती है, सोना नहीं होती।"

इसी बात को हम हिन्दी की इस कहावत द्वारा व्यक्त कर सकते हैं:

"हाथी के दाँत, खाने के और, दिखाने के और।"

पाठक स्वयं विचार करें कि हिन्दी का यह वाक्य अधिक जानदार है या अंग्रेजी का उपरिलिखित शब्दानुवाद।

(१५) कहीं कहीं पर एकवचन और बहु-वचन का भी ध्यान नहीं रक्खा जाता। एक फिल्म का नाम था

"तीन बत्ती, चार रास्ता।"

क्या यहाँ "बत्ती" के स्थान पर "बत्तियाँ" और "रास्ता" के स्थान पर "रास्ते" नहीं होना चाहिए था ?

(१६) एक फिल्म में यह वाक्य सुना था

"मुझे तेरी ही चिन्ता है।"

लेखक महोदय क्या इतना भी नहीं जानते कि यहाँ "तेरी" नहीं "अपनी" होना चाहिए था ?

(१७) फिल्म "वह कौन थी" में एक गाने की एक पंक्ति है :

"शायद फिर इस जनम में मुलाकात हो न हो ।"

यह वाक्य सर्वथा अशुद्ध है । होना चाहिए था :

"देखो, फिर इस जनम में मुलाकात हो न हो ।"

यदि "शायद" का प्रयोग करना ही था, तो वाक्य इस प्रकार का होना चाहिए था :

"अब इस जनम में शायद ही मुलाकात हो ।"

यहाँ "जन्म" को जो "जनम" लिखा गया है, इसे हम क्षम्य मानते हैं, क्योंकि यह पद्य रचना है, और "जन्म" लिखने से मात्रा की कमी पड़ जाएगी ।

(१८) एक विज्ञापन पढ़ा था

"यह फिल्म अपार भीड़ ले रहा है ।"

क्या इसे भी हिन्दी कहेंगे ?

(१९) कुछ लेखक यह समझते हैं कि जो बात उनकी कलम से निकलेगी, हिन्दी का मुहावरा बन जायेगी । एक बड़े प्रसिद्ध लेखक का एक वाक्य है :

"उनके मुँह से शुद्ध किताब बुलती है ।"

(२०) एक गाना बहुत लोकप्रिय हो गया है :

"आए नहीं तुम, एजी आए नहीं तुम—"

इस गाने में एक पंक्ति आती है :

"इतने में चन्दा ने पुकारा"

जो कोई हिन्दी की प्रकृति को थोड़ा बहुत भी समझेगा, तुरन्त पुकार उठेगा कि यहाँ "चन्दा" के स्थान पर "चन्दे" होना चाहिए ।

(क्रमशः)

बोली-अध्ययन

महेन्द्रनाथ दुबे
शोध-छात्र, हिन्दी-विभाग

वागर्थाविव संपृक्तौ वागर्थप्रतिपत्तये ।
जगतः पितरौ वन्दे पार्वतीपरमेश्वरौ ।। रघुवंश १:१ ।।

भाषा विचारों का वाहन है। आत्माभिव्यक्ति जीव की स्वाभाविक प्रवृत्ति है। अभिव्यक्ति का माध्यम होने के कारण भाषा नाना रूपों में जड़-जंगम सर्वत्र वर्त्तमान है। जड़ जीवों की भाषा अभी तक कवि कल्पना तक ही सीमित है सामान्य जन की पहुँच उन तक नहीं। उनकी अपेक्षा कुछ उच्चतर समझे जाने वाले पशु जगत में भी इसका कार्य-कलाप सीमित है क्योंकि वे प्रवृत्ति परिचालित अधिक होते हैं। भूख की प्रवृत्ति जगी और चारे की ओर दौड़ पड़े। संवेदन का प्रेषण उनका स्वभाव नहीं और समवेदन के वशीभूत भी वे कम ही होते हैं। फलतः आंगिक क्रियाओं से ही उनके सारे व्यापार सम्पन्न होते हैं। मानव उत्तम कोटि का प्राणी है। संवेदन संचारी एवं समवेदनशील होने के कारण वह समाज सापेक्ष्य होता है। सम्भवतः समाज से परे रह कर वह मानव रह ही नहीं सकता, उसकी स्थिति असामान्य हो जाती है। बुद्धि सम्पन्न होने के कारण वह क्रिया के अतिरिक्त ज्ञान द्वारा भी इच्छा की तृप्ति के साधन जुटाता है। भाषा उसमें ज्ञान की प्रधान अधिष्ठात्री है। मानव सृष्टि के कुछ ही समय बाद से वह उसके साथ है। मानवीय विकास में भाषा महान सहायिका रही है। इसे हम इस प्रकार भी कह सकते हैं कि मानव महान है क्योंकि उसके पास भाषा है।

सामान्य रूप में भाषा आन्तरिक प्रेरणा से प्रादूर्भूत ध्वनि-तन्त्रियों, अलि-जिह्व, मुख-विवर, तालु, जिह्वा, दन्त, ओष्ठ और नासिकारन्ध्र से निसृत; आभ्यान्तरिक वायु की बहिरागत तरंग है; जो इनके नाना रूपों में स्पर्श या संघर्ष आदि के कारण अपने स्वाभाविक निष्क्रमण में बाधा उत्पन्न होने पर नाना रूपों में निकल कर नाना विधि ध्वनियों को जन्म देती है तथा इन ध्वनियों के ही विविध क्रम विन्यास शब्द सृष्टि करते हैं, फलतः शब्दों का यह संसार वाक्यों का निर्माण कर भाषा को जन्म देता है, जिसके सहारे भाव संप्रेषणशील मानव अपने सन्निकर्ष के अन्य व्यक्तियों को भी क्रियाशील बनाता है। इस प्रकार जहाँ इतर जीवों में इच्छा और क्रिया का सीधा सम्बन्ध होता है [इच्छा → क्रिया] वहाँ मानव की इच्छा और क्रिया के मध्य में भाषा की भी अवस्थिति होती है। [इच्छा → भाषा → क्रिया]

भाषा की स्थिति अन्य व्यक्ति सापेक्ष्य होती है इसके लिए कम से कम दो व्यक्ति का होना अनिवार्य है। इसी कारण जहाँ भाषाहीन समाज समज तुल्य है वहाँ समाज हीन भाषा की भी कल्पना व्यर्थ ही है। भाषा व्यक्ति को समाज के सूत्र में भी बाँधती है। व्यक्ति से समाज और फिर क्रमशः अन्तराष्ट्रीय स्तर का व्यापक प्रसार भाषा को नाना भेदोपभेदों में विभक्त कर देता है। भाषा के इन कथित भेदों में कोई विभाजक रेखा नहीं खींची जा सकती फिर भी प्रसार के क्षेत्र के अनुसार इसका कलेवर कुछ भिन्नता उपार्जित करता जाता

है परन्तु इस भिन्नता का बोध हमें तब होता है जब यह कई अंशों में पर्याप्त भिन्न हो चुकी होती है, भिन्नता का श्रीगणेश कब और कहाँ से हुआ इसे हम स्पष्ट नहीं बता सकते। यहीं एक बात का उल्लेख कर देना भी अनिवार्य है। भाषा से हमारा तात्पर्य जन सामान्य की भाँति लिखित भाषा से नहीं है। हमारा विवेचन भाषा के मौखिक स्वरूप से ही है जिसका इतिहास मानवता के आदि काल से आरम्भ होता है। इस अन्य स्वरूप को अपने सांस्कृतिक विकास के क्रम में मानव ने कब चाक्षुष स्वरूप दिया और उसकी ध्वनियों के लिए अक्षर-प्रतीकों का उपयोग किया इसका भी कोई निश्चित निर्धारित समय नहीं बताया जा सकता परन्तु है वह प्रथम स्वरूप से पश्चातकालीन ही वस्तु। सम्भवत: मोहनजोदड़ो और हड़प्पा में प्राप्त लिपि चिन्ह (जो अभी तक पढ़े नहीं जा सके) ही इस प्रतीक-बद्ध भाषा के प्राचीन-तम अवशेष हैं। संस्कृत की श्रुति (वेद) को भी युगों पश्चात वैशम्पायन व्यास एवं पश्चात् कालीन लेखकों द्वारा लिपिबद्ध करन की चर्चा की जाती है पर भाषा (कथ्य—श्रव्यस्वरूप) ओंकार ब्रह्मनाद है फलत: सृष्टि का सहोदर है। लिखित रूप में उपलब्ध विश्व के प्राचीनतम ग्रंथ 'ऋग्वेद' में ही ऐसे अनेक सूक्त हैं जो तत्कालीन कथ्य लोकभाषा की ओर संकेत करते हैं। 'संस्कृत' नाम स्वमेव इस बात की घोषणा करता है कि पुरा काल में प्रचलित किसी असंस्कृत भाषा को ही संस्कार-मण्डित कर संस्कृत नाम दिया गया। महर्षि पाणिनी ने अपना व्याकरण लौकिक-संस्कृति के आधार पर तो बनाया ही उसमें भी उन्होंने तत्कालीन प्रचलित लोक भाषा को ही आधार बनाया था इस प्रकार भाषा का श्रव्यस्वरूप उसके अक्षर-बद्ध दृश्य रूप से सर्वथा भिन्न वस्तु है। यहाँ जब हम भाषा के भेदोपभेदों की चर्चा करते हैं तो उसका अभिप्राय उसके श्रव्यस्वरूप से ही है।

व्यष्टि से समष्टि की ओर प्रसारित इन भेदोपभेदों में सर्वप्रथम व्यक्ति की बोली ही आती है। प्राय: प्रत्यक व्यक्ति के ध्वन्यन्त्र में भिन्नता होती है साथ ही सबकी कथन शैली में भी पार्थक्य होता है जिसके आधार पर वक्ता को बिना देखे ही उसके शब्द सुन कर ही जान लेते हैं कि वह कौन है। संस्कृत साहित्य में चर्चित 'काकु' (ताम्ब्र) ध्वनियों के इसी वैविध्य का सूचक है। अपने निजी काकु के कारण व्यक्ति अपर जनों से भिन्न प्रकार की वाक्प्रवृत्ति (Speech habit) रखता है। व्यक्ति की निर्धारित समय की वाक्प्रवृत्ति को हम व्यक्ति-बोली वा **उपबोली** (Idiolect) कहते हैं।[1] व्यक्ति की यह बोली भी परिस्थिति सापेक्ष्य होती है प्राय: प्रवासी व्यक्ति अपने परिवार के सदस्यों के साथ एक प्रकार की उप-बोली का प्रयोग करते हैं। तो बाहर के व्यक्तियों के साथ दूसरे प्रकार की। इसके अतिरिक्त कभी-कभी व्यक्ति अपनी स्वाभाविक वाक्-प्रवृत्ति के स्थान पर परिष्कृत भाषा बोलने की चेष्टा करता है पर अनुकरण की असमर्थता के कारण यह एक अपरिपक्व प्रकार की बोली ही रह जाती है इसे हम **बनावटी बोली** (Eyedialect) कहते हैं।[2] ग्रामीण व्यक्ति जब नागरिक व्यक्तियों से बातचीत करने लगता है तो नागरिक बोली बोलने के उसके प्रयास में ऐसी बोली की झलक मिलती है। उपरोक्त प्रकार की बोलियों का विस्तार व्यक्ति तक ही होता है। फ्रेंच भाषाविद दि **सास्से** (Saussure) ने इसे **पैरोल** (Parole) अर्थात् बोली की संज्ञा दी है।[3] इसके अतिरिक्त भाषा के अन्य सभी प्रकारों को उसने **लॉन्गू** (Langue) अर्थात् 'भाषा' कहा है। अन्य भाषाविदों ने भाषा के

और भी विभाजन स्वीकार किए हैं। एक परिसिमित अंचल विशेष की नित्य व्यवहार की भाषा को **आंचलिक बोली** (Vernacular) कहा जाता है। **मेरिओ पेई** ने लगभग इसी अर्थ में **'स्लांग'** (Slang) शब्द का व्यवहार किया है। वर्गीय सीमाबद्ध बोली को **कान्ट** (Cant) कहा जाता है। इसे हम **वर्ग-बोली** कह सकते हैं। वर्ग-बोली की सीमा भौगोलिक न होकर साम्प्रदायिक होती है। यथा समान **बोली-क्षेत्र** (Speech Community) का विस्तार यदि हमें किसी तहसील के बीस ग्रामों तक व्याप्त जान पड़ता है तो यह पूरा क्षेत्र समान आंचलिक बोली का क्षेत्र होगा, परन्तु इस क्षेत्र में ही कुछ विशेष प्रकार की बोली बोलने वाले भी मिलेंगे जो यद्यपि इस क्षेत्र में अत्यन्त अल्प संख्या में होंगे परन्तु उनके अपने प्रकार के लोग चाहे सुदूर अंचलों में भी रहते हों वे भी ठीक उसी विशेष प्रकार की बोली का उपयोग करते हैं। ये लोग आपस में तो इस विशेष वर्ग-बोली का प्रयोग करते हैं पर अन्य लोगों के साथ वे उस क्षेत्र की आंचलिक बोली का ही प्रयोग करते हैं। उत्तर प्रदेश के पूर्वी जिलों (आजमगढ़, बलिया, गाजीपुर, वाराणसी, गोरखपुर, देवरिया) में रहने वाले नोनाचमार, डोम, मुसहर आदि जातियाँ ऐसी ही वर्ग-बोली (Cant) बोलती हैं।

बोली का एक प्रकार वह भी है जो औद्योगिक वातावरण में पनपता है। इसे **व्यावसायिक बोली** (Jargon) कहते हैं। प्रायः प्रत्येक उद्योग में एक विशिष्ट प्रकार की बोली चल पड़ती है। जिसमें उस उद्योग के तकनीकी शब्दों का बहुतायत से व्यवहार होता है। इस दृष्टि से एक प्रकार के उद्योग का दूसरे प्रकार के उद्योग की बोली से पार्थक्य हो जाता है। आजमगढ़ जिले में मुबारक पुर, खैराबाद, और मऊ कपड़ा बुनने के केन्द्र हैं। इनमें भौगोलिक दृष्टि से दूरी है फिर भी इनमें प्रचलित भाषा बिलकुल एक सी है। इस उद्योग में भी जुलाहे जाति के आधिक्य के कारण यह बोली भी वर्ग-बोली (Cant) बन गई है। बोलियों के ऐसे ही उतार चढ़ाव को लक्ष्य कर मेरिओ पेई ने वर्त्तमान व्यवसायिक बोली को भविष्य की वर्ग-बोली कहा है।[४]

बोली इन सभी प्रकार की उपबोलियों की समष्टि है; फिर भी इसमें **आंचलिक बोली** (Vernacular) का योग ही अधिक होता है। भाषा, बोली से पृथक कोई वस्तु नहीं है। हम यह नहीं कह सकते कि इन-इन अंचलों में लोग बोली बोलते हैं और अन्य अंचलों के लोग भाषा। यथार्थ में सभी किसी न किसी बोली का ही व्यवहार करते हैं। अपने व्यापक प्रसार और प्रभाव के अनुरूप कोई बोली ही विकसित होकर भाषा का रूप ले लेती है। इसी प्रकार कभी-कभी अपनी दुर्बोधता एवं अन्य आकस्मिक राजनयिक घटनाओं के कारण भाषा भी संमुचित होकर बोली मात्र रह जाती है। यदाकदा उसका स्वरूप इतना कम प्रचलित हो जाता है कि उसे **मृतभाषा** (Dead Language) भी कहा जाने लगता है। बोली की अपेक्षा भाषा पर व्याकरण का बंधन अधिक होता है उसकी भौगोलिक सीमा व्यापक होती है। उसके समझने और बोलने वालों की संख्या भी 'बोली' से कई गुना होती है। जीवन के विभिन्न क्षेत्रों में विभिन्न बोलियों के लोग एक दूसरे से उसी के सहारे वार्त्तालाप करते हैं। भाषा का अपना साहित्य भी होता है। उसका शब्द भंडार व्यापक होता है तथा विभिन्न बोलियों के शब्दों का उपयोग करने से वह समूचे अंचल की बोलियों के लिए बोधगम्य हो जाती है।

साहित्य के क्षेत्र में प्रायः सुनने में आता है कि अमुक ने भाषा विषयक बड़ी भारी देन दी है। अमुक साहित्यकार ने इसके शब्द-वैभव को बढ़ाया है पर बात ऐसी है नहीं। भाषा कृत्रिम उपायों से बढ़ाई जाने वाली वस्तु नहीं और न तो एकान्त में बैठकर कोई साहित्यकार उसके शब्द भंडार को बढ़ा सकता है। भाषा सामान्य जन के नित्य नैमित्तिक व्यवहारों से बढ़ती है। भाषा के लिए सामान्य जन की देन किसी भी तथाकथित साहित्यकार से अधिक होती है। हाँ यदि साहित्यकार ऐसे शब्दों को चुनकर, जो लोक व्यवहार में प्रचलित हो चुके हों पर भाषा की सीमा से अभी दूर हैं, उनका प्रयोग अपनी रचनाओं में करता है तो अवश्य ही वह भाषा की शब्द-सम्पत्ति बढ़ाता है। भाषा का बहुमुखी विकास भी उसके समृद्ध साहित्य पर ही निर्भर करता है। साहित्य संवलित भाषा यातायात एवं राजकाज में प्रयुक्त शब्दावली से परिपूर्ण होती है फलतः उसे राज्य स्तर या राष्ट्रस्तर पर मान्यता प्राप्त होती है तथा समग्र राष्ट्र के पारस्परिक व्यवहार एवं सरकारी काम-काज का माध्यम होकर वह **राष्ट्र-भाषा** कहलाने लगती है। जिस भाषा को अन्तराष्ट्रीय व्यापार एवं राजकीय काम काज के वहन करने का अवसर प्राप्त होता है वह **अन्तराष्ट्रीय भाषा** बन जाती है। इस प्रकार व्यक्ति से बढ़ कर बोली का क्षेत्र अन्तर्राष्ट्रीय स्तर तक फैल जाता है पर उसके तथानिरूपित भेदोपभेद कहाँ उत्पन्न होते हैं इसका निश्चित स्थान तो नहीं ज्ञात होता, जब उसमें पर्याप्त विभिन्नता लक्षित होने लगती है तब हम देखते हैं कि एक उपविभाग अन्य विभाग में परिवर्तित हो गया है। बोली का यह राजमार्ग सदा उसके संचरण से गुंजायमान रहता है।

बोली अध्ययन की प्रवृत्ति आधुनिक युग में पाश्चात्य जगत की देन है। पाश्चात्य भाषा शास्त्रियों ने अब तक लगातार इस क्रम में नवीन अनुसंधान कर अज्ञात अथवा अत्यन्त सीमित एवं जटिल समझी जाने वाली बोलियों को भी सुगम बना दिया है। यहाँ यह तथ्य भी उल्लेख्य है कि जब तक पाश्चात्य भाषाशास्त्रियों का भारतीय भाषाशास्त्र से परिचय नहीं हुआ था तब तक वे इस क्षेत्र में उन्नति नहीं कर सके थे। सर्वप्रथम १७८६ में **विलियम जोन्स** ने अपने एक वक्तव्य में यह घोषणा की कि '‘संस्कृत’ का ग्रीक और लैटिन से इतना अधिक साम्य है कि कोई भी भाषा-शास्त्री उन्हें एक ही स्रोत से प्रसूत भाषा माने बिना उनका सम्यक निरीक्षण नहीं कर सकता'।[5] भारतीय ब्राह्मणों के सत्प्रयास से ऋग्वेद का अविकल रूप पाकर भाषाशास्त्र और भाषाशास्त्रज्ञ दोनों ही कृतार्थ हो गए। भाषा के आदि-स्वरूप का बोध कराने में ऋग्वेद से अधिक सहायक और कोई वस्तु सम्पूर्ण विश्व में नहीं है। महर्षि पाणिनी का सर्वाङ्ग पूर्ण व्याकरण अधुनातम भाषा-विज्ञान का प्रधान प्रेरणा स्रोत बना। आधुनिक भाषाविद **ब्लूम फील्ड** ने कहा है कि 'यह व्याकरण जो संभवतः ३५०—२५० ई० पूर्व रचित जान पड़ता है मानव-मेधा प्रसूत विश्व की सर्वोत्तम निधियों में से एक है। यह भाषा के सूक्ष्मतम उपादानों का अत्यन्त विस्तार से वर्णन करते हुए उसकी प्रत्येक सन्धि, परिवर्तन, व्याकरण एवं वाक्यसंगठन की दृष्टि से लेखक की बोली का सम्यक् ब्योरा उपस्थित करता है। इस प्रकार के सुसम्पन्न विश्लेषण के रूप में आज तक कोई भी भाषा विश्लेषित नहीं की जा सकी है'।[6] उन्होंने स्पष्ट शब्दों में स्वीकार किया है कि "भारतीय व्याकरणों ने ही पहले पहल योरोपियन भाषाविदों के समक्ष भाषा

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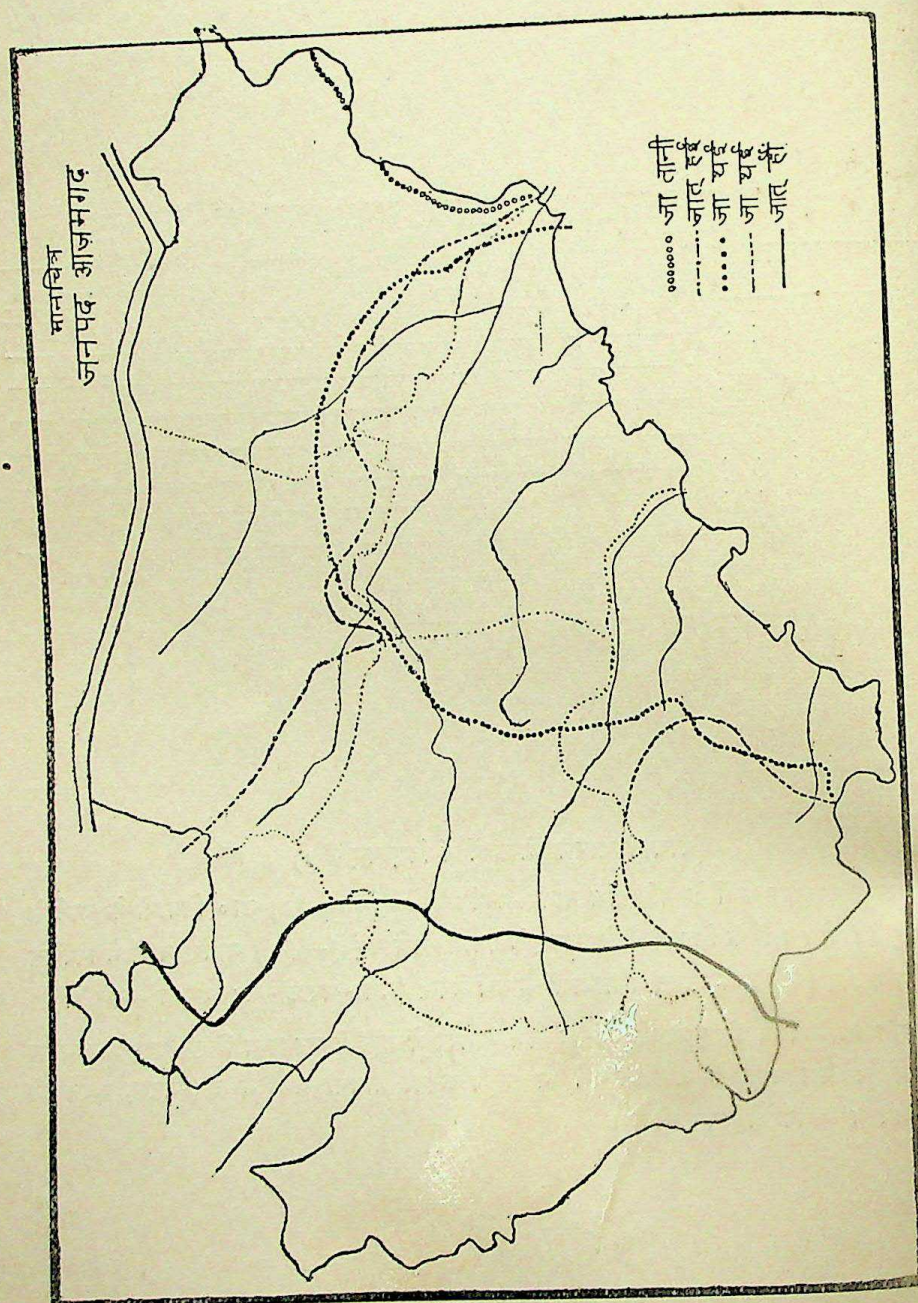
		Bi-labial द्वयोष्ठ्य	Labio-dental दन्त्योष्ठ्य	Dental and Alveolar दन्त्यवर्त्स्य	Retroflex मूर्धन्य	Palato-alveolar तालुवर्त्स्य	Alveolo-palatal वर्त्स्य तालव्य	Palatal तालव्य	Velar कण्ठ्य	Uvular अलिजिह्व	Pharyngal उपालिजिह्व	Glottal काकल्य
CONSONANTS व्यंजन	Plosive स्पर्श	p b प ब		t d त द	ʈ ɖ ट ड			c ɟ कं, गं	k g क ग	q ɢ क़ ग़		ʔ ʔ
	Nasal नासिक्य	m म	ɱ ग	n न	ɳ ण			ɲ ञ	ŋ ङ	N ङ॰		
	Lateral Fricative पार्श्विक संघर्षी			ɬ ɮ ल ळ								
	Lateral Non-fricative पार्श्विक संघर्षहीन			l ल	ɭ ल़			ʎ लँ				
	Rolled लुंठित			r र						R ऱ		
	Flapped उत्क्षिप्त			ɾ ड़	ɽ ढ़					R ऱ		
	Fricative संघर्षी	ɸ β प़ व़	f v फ़ व	θ ð | s z | ɹ थ द | स ज | र	ʂ ʐ ष ज़	ʃ ʒ श झ़	ɕ ʑ श़ य़	ç ʝ य़ म	x ɣ ख़ ग़	χ ʁ ख़ ग़	ħ ʕ ह ʕ	h ɦ ह़ ह
	Frictionless Continuants and Semi-vowels संघर्षहीन सप्रवाह तथा अर्द्धस्वर	w ɥ ꝑ ए	ʋ व	ɹ ʒ				j (ɥ) य (ए)	(w) (व)	ʁ ग		
VOWELS स्वर	Close संवृत्त	(y ʉ u) (ई ऊ ऊ)						Front अग्र i y e ø ए ए ɛ œ ऐ ऐ æ ऐ a आ	Central मध्य ɨ ʉ ई ऊ ə अ ɐ अ	Back पश्च ɯ u ɤ o ओ ओ ʌ ɔ ओ औ ɑ ɒ आ ऑ			
	Half-close अर्द्ध संवृत्त	(ø o) (ए ओ)										
	Half-open अर्द्ध विवृत्त	(œ ɔ) (ऐ औ)										
	Open विवृत्त	(ɒ) (आ)										

(Secondary and articulations are shown by symbols in brackets)

(गौण-उच्चारण कोष्ठकों में दिए गए हैं।)

अन्तरराष्ट्रीय वर्णों के अधिकांश नागरी-पर्याय (equivalent) डा॰ तिवारी के चार्ट से लिए गए हैं। शेष वर्णों के लिए यहाँ दो प्रकार के पर्याय रक्खे गए हैं—(१) नागरी वर्णों में किंचित परिवर्तन करके, (२) अन्य भारतीय भाषाओं के वर्ण लेकर (यथा—मराठी—ळ; बंगला—ब)।

नोट—उन ध्वनियों के लिए जिनके व्यंजक वर्ण नागरी में नहीं हैं पर अन्य किसी भारतीय भाषा में हैं; उस भाषा के अपेक्षित वर्ण को ग्रहण करना नागरी वर्णों में तोड़-मरोड़ करने की अपेक्षा अधिक श्रेयस्कर होगा।

मानचित्र
जनपद आज़मगढ़
जा तानी
जात हई
जा यई
जा यई
जात हैं

का परिपूर्ण वर्णनात्मक विवेचन प्रस्तुत किया जो मात्र सिद्धान्तों पर ही आधारित नहीं था वरन् सम्यक निरीक्षण पर आधारित था।···इससे भी महत्त्वपूर्ण वस्तु, भाषा को परखने का दृष्टिकोण है जिसे भारतीय व्याकरणों ने विश्व को प्रदान किया है।"[७]

भाषाशास्त्र का अतीत भारतीय वाङमय में ही रमा हुआ है। **व्याडि, शाकटायन, पाणिनी, कात्यायन, पतंजलि** और **हेमचन्द्र** की प्रतिभा के सहयोग से ही इस मृत-प्राय विषय में पुनः प्राण फूकने में आधुनिक भाषाविद समर्थ हो सके हैं। परन्तु उनके वंशज अपनी इस परम्परा का उत्तारदायित्व न सँभाल सके। देश की राजनयिक परिस्थितियाँ भी इसके अनुकूल नहीं थीं। अतः आधुनिक युग में हमें अपनी दृष्टि को ही पाश्चात्य भाषाविदों के सहयोग से समझना पड़ा। वर्त्तमान भाषाशास्त्र अधिकांश में पाश्चात्य भाषाशास्त्रियों की देन है जिनमें विशेषतः जर्मनी, इटली, इंगलैण्ड और अमेरिका जैसे देश के भाषा-विद विशेष पथ-प्रदर्शक रहे हैं। परन्तु १८वीं शती तक ये पाश्चात्य भाषाशास्त्री आंचलिक बोलियों का महत्त्व नहीं आँक सके थे। वे मान्यता प्राप्त **प्रामाणिक भाषा** (Standard Language) को ही प्राचीनतर और आंचलिक बोली का भी आधार मानते थे परन्तु कालान्तर में वे आंचलिक बोलियों की महत्ता समझ सके और तब बोलियों का व्यापक अध्ययन आरम्भ हुआ और १८वीं शती के अन्त तक बोली-कोश रचे जाने लगे।

साम्प्रत, बोलियों के अध्ययन के प्रमुख तीन विभाग दिखाई पड़ते हैं जिनमें प्राचीनतम रूप **'कोश-विज्ञान'** का ही है। प्रारम्भ में तो **'बोली-कोष'** केवल ग्राम्य बोलियों के शब्दों का अर्थ सहित संकलन मात्र अपना उद्देश्य समझते थे परन्तु अब इनमें आंचलिक बोली के सभी प्रचलित शब्दों का पदग्रामीय एवं ध्वनिग्रामीय सविस्तर अध्ययन प्रस्तुत किया जाता है।

दूसरे प्रकार का अध्ययन **व्याकरण** विषयक है। प्रायः किसी बोली विशेष को उसे अपने क्षेत्र विस्तार के ऐतिहासिक विकास क्रम के तारतम्य में अध्ययन कर उसका व्याकरण तैयार करना तथा उसे दूसरों के लिए सुगम बनाना ही इस प्रकार के अध्ययन का उद्देश्य होता है। नवीन अनुसंधानों के पश्चात् अब इसका भी क्षेत्र विस्तृत हो गया है और अब वैयाकरण बोली के पद विज्ञान, ध्वनि विज्ञान के सूक्ष्म तत्त्वों एवं वाक्य संगठन के रूपों की ओर विशेष ध्यान देने लगे हैं। इस प्रकार का प्रथम प्रयास हमें १८२१ में प्रकाशित **जॉन एन्ड्रेस श्मेलर** (Johann Andreas Schmeller) के 'बैवेरियनग्रामर' (Bavarian grammer) में परिलक्षित होता है।

बोली अध्ययन के ये दोनों रूप हिन्दी के क्षेत्र में भी पर्याप्त विस्तार पा चुके हैं। 'कोश-विज्ञान' की दृष्टि से हिन्दी बोलियों के क्षेत्र में प्रारम्भिक कार्य एच. एम. **इलियट,** प्रो० एच० एच० **विल्सन** तथा श्री जे० आर रीड का है परन्तु सारा कार्य अब लगभग अप्राप्य सा है। श्री जे० आर० **रीड** ने 'आजमगढ़ ग्लासरी' नाम से आजमगढ़ जिले में प्रचलित बोली के शब्दों का बृहत संकलन और व्याकरण तैयार किया था परन्तु वह बहुमूल्य सामग्री तत्कालीन सेटिलमेंट रिपोर्ट की फाइलों में ही दबी हुई है। श्री **विलियन क्रुक** की सूचना के अनुसार उन्होंने उपर्युक्त तीनों विद्वानों की कृतियों का उपयोग अपने ग्रन्थ

'ए डाइजेस्ट आफ रूरल ऐंड एग्रीकल्चरल टर्म्स' में किया था जिसका प्रथम संस्करण १८७९ ई० में इलाहाबाद के सरकारी प्रेस से प्रकाशित हुआ था तथा दूसरा परिवर्धित संस्करण १८८८ में गवर्नमेंट प्रिंटिंग इंडिया (कलकत्ता) से निकला था। **डा० ग्रियर्सन** ने क्रूक की इस सामग्री का पूरा उपयोग किया था और उसी आधार पर १८८५ में 'पीजेंट लाइफ आफ बिहार' नामक अपना ग्रन्थ प्रकाशित किया था जो अब भी अपनी व्यापक शोध-क्षमता के कारण आदर्श बना हुआ है। इधर बिहार शासन के तत्वावधान में उसका नवीन संस्करण भी प्रकाशित हुआ है। १८८७ में इलाहाबाद के मिशन प्रेस से प्रकाशित "कचहरी टेकनिकैलिटीज़" श्री पैटरिक **कार्नेगी** कृत एक प्रभूत सामग्री सम्पन्न संकलन है जो भावी कृतियों को दिशा निर्देश देता रहेगा। उक्त संकलनों के आधार पर १९५६ में डॉ० **हरिहर प्रसाद गुप्त** ने 'आजमगढ़ की फूलपुर तहसील की बोली के आधार पर 'ग्रामोद्योग और उनकी शब्दावली' का प्रकाशन किया। लेखक ने इसमें प्रचलित लोकोक्तियों एवं मुहावरों का सन्निवेश तो किया ही यत्र तत्र व्युत्पत्ति सुझाकर इस प्रकार के कार्य को और भी उच्चतर रूप प्रदान करने का प्रयास किया। इधर डा० **अम्बाप्रसाद सुमन** ने इस प्रकार का सर्वतो भावेन सम्पन्न अपना शोध-प्रबन्ध 'कृषक-जीवन सम्बन्धी-ब्रजभाषा-शब्दावली' प्रस्तुत किया है जिसे उन्होंने अलीगढ़ जिले की बोली के आधार पर संकलित किया है। विस्तृत हिन्दी क्षेत्र के प्रत्येक अंचल में परिव्याप्त शब्दावली का संकलन यदि सम्पन्न हो जाय तो विश्व की शायद ही कोई भाषा हिन्दी की शब्द सम्पत्ति का सामना कर सके। आज हिन्दी में शब्दाभाव का जो नगारा बज रहा है वह श्रम और शोध न करने वाले लोगों का एक भुलावा मात्र है अन्यथा देहातों एवं नगरों की प्रभूत शब्दावली का समायोजन इस अभाव की गंध भी न आने देता।

बोलियों को स्वतन्त्र रूप में लेकर उनके ऐतिहासिक, व्याख्यात्मक अथवा तुलनात्मक अध्ययन का कार्य भी हिन्दी क्षेत्रों में पर्याप्त दिनों से चल रहा है। इसमें भी डा० ग्रियर्सन हानर्ले, वीम्स, टर्नर, ह्यूज फ्रेजर, सुनीतिकुमार चटर्जी आदि विद्वानों ने जो मार्ग प्रदर्शन किया है वह अनुकरणीय है। इस श्रेणी की कृतियों का अनेक स्थानों पर वृहद् वर्णन किया गया है अतः यहाँ उनका पृष्ट पेषण करना ठीक नहीं। इनमें से बहुतों का प्रकाशन नागरी लिपि में भी हो रहा है परन्तु कितने ही बहुमुल्य ग्रन्थ हैं जो अभी तक नागरी लिपि में प्रकाशित नहीं हो सके हैं। नागरी **अर्ध-वर्णनात्मक** लिपि है फलतः ध्वन्यात्मक रूपों का अंकन उसमें सम्भव भी नहीं था। इसकी अपेक्षा 'इन्टरनेशनल फोनेटिक अलफाबेट" (आई० पी० ए०) (चित्र १) सुगम होने के कारण इस प्रकार के कार्य उसी लिपि में निबद्ध किए गए। **डा० धीरेन्द्र वर्मा, डा० बाबूराम सक्सेना, डा० विश्वनाथ प्रसाद** एवं **डा० उदयनारायण तिवारी** ने नागरी में अपने जिन ग्रन्थों का प्रकाशन किया उनमें अपनी विश्लेष्य वस्तु के लिए नए-नए लिपि चिह्न (Trancription) बना लिए हैं। उनमें भी एकता का अभाव है। नागरी लिपि के सुधार, परिष्कार यहाँ तक कि त्याग तक के सुझाव विद्वानों ने दिए हैं पर यह स्वयं में एक भारी विषय है इसकी चर्चा यहाँ उचित नहीं। आवश्यकता इस बात की है कि नागरी लिपि में ही उसीके प्रतीकों के साथ कुछ अन्य आवश्यक प्रतीकों की परिकल्पना कर ली जाय; ऐसे चिह्न जो एक ही ध्वनि के लिए

दो-दो हैं एक कर लिए जाँय तथा दूसरे को दूसरी का सूचक मान लिया जाय, ऐसे चिन्ह जो एक से अधिक ध्वनियों का निरूपण करते हैं उनमें केवल एक ध्वनि मानकर दूसरी ध्वनि के लिए नवीन चिह्न मानलिए जाँय। इधर डा० उदयनारायण तिवारी ने आई० पी० ए० के अनुसार ही नागरी लिपि का चार्ट प्रस्तुत किया है।[८] यदि सभी विद्वान एवं शोधकर्त्ता सुधार परिष्कार के अनन्तर इसी प्रकार के एक चार्ट के अनुसार (टांसक्रृपशन) अभिलेखन प्रयोग में लावें तो यह कार्य अधिक शुद्ध एवं सुसम्पन्न हो जाय। थोड़े बहुत भेदोपभेद तो आ ही सकते हैं। अंग्रेजी के क्षेत्र में भी कितने लोगों ने आई० पी० ए० चार्ट की अपेक्षा पाइक के चार्ट का प्रयोग किया है। डा० डेनियल जोन्स ने आ० पी० ए० के साथ ही नवीन ध्वनि प्रतीकों का प्रयोग किया है। ऐसे ही अनेकों भेद आवश्यकतानुरूप प्रत्येक स्थान पर आ सकते हैं फिर भी आधार एक होने से छोटे मोटे भेद विशेष दुरुह नहीं रह जाएँगे।

बोली अध्ययन का तीसरा प्रकार जिसे **बोली-भूगोल**[९] (Dialect Geography) कहा जाता है हिन्दी के क्षेत्र में सर्वथा अछूता है। अपनी व्यापक निरीक्षण दृष्टि एवं स्पष्टतर शैली के कारण बोली-भूगोल बोली अध्ययन का सर्वोत्तम प्रकार है। बोली भूगोल की मानचित्र प्रणाली इस क्षेत्र में विशेष आकर्षक हुई है। **बोली-मानचित्र** (Dialect Atlases) जो संवाक-रेखाओं से विभक्त होते हैं; बोलियों में पारस्परिक विशेषताओं को समझाने में अधिक सहायक होते हैं। ये **संवाक रेखाएँ** (Isoglosses) भाषा की प्रत्येक विशिष्टताओं के आधार पर बनाई जा सकती है। बोली की **गठनात्मक** (Structural) **पदग्रामिक** (Morphonemic) **ध्वन्यात्मक** (Phonemic) वाक्य गठन (Syntactic) एवं उच्चारण-प्रक्रिया की विभिन्नताओं के प्रसार की बाह्य सीमा का निर्धारण संवाक रेखा खींच कर दिखाया जाता है। जहाँ पर बोली की ऐसी विभिन्नताओं को परिलक्षित करने वाली संवाक रेखाओं का **गुच्छ** (Bundle of Isoglosses) बन जाती है वहीं से बोली का पार्थक्य सूचित होता है। बोलियों की स्थिति पृथक में रूप नहीं होती। प्रत्येक सीमावर्त्ती बोली दूसरी से अधिकांश समानता रखती है। यदि बोलियों का क्रम 'क' से 'ह' तक हो तो 'क' अपनी सीमावर्त्ती 'ख' से अधिक समानता लिए होगी। और 'ख' 'ग' से। इसी प्रकार प्रत्येक का क्रम होगा पर 'क' तथा 'ह' में स्पष्टतः भिन्नता दिखाई पड़ेगी। अतः सवाक रेखा भिन्नता के स्थान का निर्देश लगभग की मात्रा में ही बताती है। एक कठिनाई यह भी होती है कि प्रत्येक उपादान के लिए यदि ऐसे मानचित्र बनाए जाँय तो हमें बहुत अधिक मानचित्रों की अपेक्षा होगी, जो बड़ा दुरूह कार्य होगा। साथ ही एक व्यक्ति व्यापक क्षेत्रफल पर कार्य नहीं कर सकता। इन सब कमियों के होते हुए भी 'बोली-भूगोल' बोली अध्यन में विशेष सहायक हुआ है। शब्दों के औच्चारणिकरूप, क्रियाओं के लिंगानुसार भेद, वाक्यों का संगठनात्मक स्वरूप जिस स्पष्टता से संवाक रेखाओं द्वारा पृथक किए जाते हैं उनसे बोलियों के तुलनात्मक अध्ययन में पर्याप्त सरलता हो जाती है। यहाँ हम आजमगढ़ जिले के विभिन्न अंचलों में बोले जाने वाले "मैं जाता हूँ" वाक्य के रूप को इन रेखाओं द्वारा उदाहरणार्थ प्रस्तुत करते हैं। वैसे तो प्रत्येक शब्द का अपना पृथक इतिहास होता है और उसके औच्चारणिक रूप के अनुसार उसकी संवाक रेखाओं का निदर्शन किया

जा सकता है पर वाक्यों में, जो भाषा की मूल इकाई होते हैं, इन शब्दों के ध्वन्यात्मक रूप साथ के शब्दों के अनुरूप ढल जाते हैं कुछ दूर तक तो यह भेद मात्र स्वनो (Alophone) का होता है पर आगे चल कर यह **ध्वनिग्रामीय** (Phonemic) तथा **पदग्रामीय** (Morphonemic) भी हो जाता है।

बोलियों का इस प्रकार का अध्ययन जर्मन भाषाविद **जार्ज वेंकर** (Georg wenker) ने १८७६ में प्रारम्भ किया था तथा १८८१ ई० में उन्होंने अपने अध्ययन के छः मानचित्र प्रकाशित किए। बाद में जरमनी सरकार की सहायता से उन्होंने जरमनी की बोलियों का व्यापक सर्वेक्षण किया। इसके लिए उन्होंने चालीस वाक्यों की एक सूची तैयार की थी जिसे लगभग ४० हजार क्षेत्रों के पाठशाला अध्यापकों से उन क्षेत्रों की बोलियों के अनुरूप अनूदित कराया था जिनके अनुसार मानचित्रों पर इन विभिन्नताओं को प्रदर्शित किया। इनका प्रकाशन १९२७ ई० के पश्चात एफ० **रेड** (F. wrede) के सम्पादकत्व में आरम्भ हुआ। वेंकर महोदय का कार्य एक विस्तृत क्षेत्र पर होने के कारण अब भी अपनी महत्ता रखता है परन्तु इसकी बड़ी भारी कमी यह है कि इसका विधिवत पूर्ण प्रकाशन नहीं हो सका है। दूसरी कमी इस कारण भी आ गई है कि सर्वेक्षण का यह कार्य प्रशिक्षित भाषाविदों द्वारा सम्पन्न न होने के कारण ध्वनियों का वास्तविक रूप स्पष्ट नहीं हो पाया है। इसके अतिरिक्त चालीस वाक्यों में भाषा की बहुत कम विशेषताओं का ही विवेचन हो सका है। बाद में इन कमियों को दूर करने के लिए १९३८ में **मिजक** (Mitgka) तथा ई० **वरनर** (E. Zwirner) ने नए सेट तैयार किए तथा सर्वेक्षण का कार्य विशेषतः टेप रेकार्ड द्वारा कराया जिससे संकलित सामग्री विश्लेषणार्थ अन्य भाषाविदों को भी देने की सुविधा हो गई।

फ्रांस में जे० **गिलेराँ** (Jules Gilliéron) ने वेंकर की कमियों से बचने के लिए अपने एक शिष्य एडमंडएडमांट को पूर्ण प्रशिक्षित कर उसी के द्वारा एक सीमित क्षेत्र में सर्वेक्षण करवाया। एडमांट ने ६३९ अंचलों से संकलन किया जिसके आधार पर जे० गिलेराँ ने अपना फ्रेंच भाषा का मानचित्र १९१० में प्रकाशित किया। बाद में इटली, डेनमार्क तथा रूमानियाँ आदि में भी मानचित्रों का प्रकाशन हुआ। इन प्रकाशनों में अमेरिका के **हान्स कुरथ** (Hans Kurath) के सम्पादकत्व में प्रकाशित न्यू इंगलैंड एटलस उल्लेख्य हैं। उन्होंने सामग्री संकलन की शुद्धता एवं परिपूर्णता के लिए सर्वतोभावेन सम्पन्न एक **प्रश्नावली** (Questionnaire) तैयार की तथा सर्वेक्षणार्थ **प्रतिलेखन** (Transcription) में कुशल प्रशिक्षित व्यक्तियों को सर्वेक्षण के लिए नियुक्त किया। साथ ही उन्होंने उचित क्षेत्र एवं उचित **सूचको** (Infomants) से ही सामग्री संकलित करने का निर्देश दिया। उनके सूचकों में विशेषकर ७० वर्ष से ऊपर की वय के लोग थे। इसके अतिरिक्त सामाजिक एवं शैक्षणिक स्तर के अनुरूप सामग्री का पृथक संग्रह किया गया। इस प्रकार की भरी पूरी सामग्री से युक्त उन्होंने १९४३ में अपना बोली-मानचित्र प्रकाशित किया। अब लगभग विश्व के सभी देशों में इस प्रकार के मानचित्र प्रकाशन का कार्य चल रहा है।

भारत में अभी इस प्रकार का कोई कार्य सम्पन्न नहीं हो सका है। डा० ग्रियर्सन ने सरकारी सहायता से पूरे देश का भाषा सर्वेक्षण किया था जिसका प्रकाशन १९२७ ई० में

हुआ। पश्चात्कालीन होने पर भी इस सर्वेक्षण में भी वेंकर जैसी ही कमियाँ रह गई हैं। डा० ग्रियर्सन ने सर्वेक्षण के लिए बाइबिल की एक कथा चुनी थी जिसे उन्होंने जिला के कलेक्टरों के पास भेज दिया था। कलेक्टरों ने उसे तहसीलदारों को तथा तहसीलदारों ने पटवारियों को सौंपा। इस प्रकार पटवारियों ने अपनी बोली में उसका अनुवाद कर उसे लौटाया। **ध्वनि-अनुरूप-लेखन** के अज्ञान के कारण ये सूचक शुद्ध सामग्री देनें में असमर्थ तो थे ही दूसरे इन पर कचहरी की उर्दू अंगरेजी मिश्रित खिचड़ी बोली का भी अधिक प्रभाव था। चूंकि यह सर्वेक्षण व्यापक स्तर पर हुआ था और विश्लेषण के लिए विपुल सामग्री उपलब्ध हो गई थी अतः अपनी सजग प्रतिभा से डा० ग्रियर्सन ने शुद्ध सामग्री तक पहुँचने की चेष्टा की और उसके अनुरूप अपना विश्लेषण किया, फिर भी इस प्रयास में शुद्धता की कमीं रह ही गई। इसके अतिरिक्त सर्वेक्षित सामग्री भी अत्यन्त लघु थी जिसके कारण भाषा-गठन के सभी उपादान नहीं मिल सके। इन सारी कमियों के बावजूद डा० ग्रियर्सन का कार्य अभी तक अपने रूप का अकेला है। यद्यपि स्वतन्त्रोत्तर भारत में भाषा सर्वेक्षण के कार्य छिट-पुट रूप में होने लगे हैं तथा विश्वविद्यालयीय शोध-प्रबन्धों के रूप में इस प्रकार की सामग्री भी प्रस्तुत होने लगी हैं; कुछ स्वतन्त्र-संस्थाएँ भी इस कार्य में लगी हुई हैं, फिर भी अभी राष्ट्र-स्तर पर समग्र देश का बोली सर्वेक्षण एवं मानचित्र निर्माण नहीं हो सका है अतः आवश्यकता इस बात की है कि इस वाणी के वैभव से सम्पन्न देश का यथा शीघ्र विशुद्ध बोली सर्वेक्षण एवं मानचित्र तैयार किया जाय।

उद्धरण

1 '......the totality of speech habits of a single person at a given time constitutes an idiolect. [C. F. Hockett—A Coursse in Modern Linguistics Page-321]

2 'A crude but common device often utilized to convey the illusion of substandard pronunciation is eye-dialect'. [Raven 1. Mc David,—The dialects of American English Page-541]

3 'un acté individuel dé volanté et d' intelligence

4 'The jargon of the yonger generation might be described as the slong of the future.' [Merio Pei, Story of Language P. 179]

5 'Sanskrit bears to greek and Latin a strongers affinity, both in the roots of verbs and in the form of grammer than could possibly have been produced by accident; So strong indeed, that no philologer could examine all three without believing them to have sprung from some common source. [Asiatic research]

6 "This grammer (of Pāṇini) which dates from somewhere round 350 to 250 B.C. is one of greatest monuments of human intelligence. It describes with the minutest detail, every inflection derivation, and composition, and every syntactic usage of it's author's speech. No other language, to this day, has been so perfectly described. '[L. Bloomfield, Language Page 11]

7 'The Indian grammer presented to European eyes, for the first time, a complete and accurate description of a Language, based not upon theory but upon observation......Even more important was the insight into linguistic structure which one got from the accurate and systematic Hindu grammer' [Ibid]

८ डा० तिवारी ने आइ० पी० ए० चार्ट के समकक्ष पृथक रूप से नागरी का चार्ट प्रस्तुत किया है यहाँ पाठकों के तुलनात्मक अध्ययन की सुविधा के लिए दोनों को एक ही चार्ट में प्रस्तुत किया जा रहा है। एक साथ प्रस्तुत किए जाने के कारण लिपिचिह्न ऊपर नीचे हो गए हैं परन्तु वस्तुतः वे स्थान और प्रयत्न की दृष्टि से एक ही हैं। —लेखक

९ बोली-भूगोल का सम्बन्ध विशेषकर मानव-भूगोल (Human Ceorgraphy) से ही है। पुरातन काल में जब आवागमन के पर्याप्त साधन सुलभ नहीं थे तो प्रकृत-भूगोल (Physical Geography) भी बोली भेद का कारण था पर आज के वैज्ञानिक युग में वे तत्त्व बाधक नहीं रहे। बोली विचार विनिमय का माध्यम होने के कारण विनिमय सुगम एवं विनिमय अगम रूपों के कारण ही विभक्त होती है। भारत विभाजन के पूर्व आसाम के कछार जिले में ढाका शैली की बँगला प्रचलित थी क्योंकि भौगोलिक दृष्टि से यह ढाका के निकट पड़ता था परन्तु विभाजनोपरान्त ढाका से विनिमय-सुगम न रहा फलतः दूर होने पर भी वहाँ अब कलकत्ता-शैली की बँगला प्रचलित हो गई है जब कि कलकत्ता के सीमावर्त्ती पाकिस्तान स्थित पूर्वी दिनाजपुर एवं पूर्वी मुर्शीदाबाद में ढाका शैली की बँगला चल पड़ी है। —लेखक

जनमानस में पपीहा

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साहित्य मानवी भावनाओं का प्रतिबिंब है। मनुष्य के विचारों का आविर्भाव साहचर्य के सिद्धान्त (Principle of association) पर आधारित होता है। हमारी अपेक्षा हमारे पूर्वजों का प्रकृति के संसर्ग में अधिक काल-यापन हुआ था। इस कारण उनकी भावनाओं में प्रकृति का विशेष अंश है। ऋग्वेद के मंत्रद्रष्टा ने प्राकृतिक उपादानों की शक्ति और रहस्यमयता से आकृष्ट होकर उनके स्तवन में अपनी सारी भाव प्रवणता उँडेल दी है। इन प्राकृतिक उपादानों की महिमा और उनकी भय मिश्रित श्रद्धा से वे उनकी ओर जितने ही आकृष्ट हुए उतना ही चेतन प्राणियों की ओर भी, क्योंकि उनसे उनका दैनंदिन संबन्ध था। चेतन प्राणियों में भी पक्षियों ने उनकी संवेदनशीलता को और अधिक आकृष्ट किया क्योंकि उनका जीवन उन्हें अपने जीवन के अधिक समानान्तर प्रतीत हुआ। उनके नीड़-निर्माण, डिंब-सेवा, शावक-परिचर्या ने उनकी (मानव की) संपूर्ण पारिवारिक भावना को अपनी ओर आकृष्ट कर लिया। पक्षियों में वह शक्ति है कि वे गगनचारी मेघों में उन्मुक्त विहार कर सकते हैं, दुर्गम पर्वतों, वनों और विशाल समुद्रों को क्षण मात्र में पार करके हमारी कोमल भावनाओं के आदान-प्रदान के माध्यम बन सकते हैं। पक्षियों से हमारे इतने अधिक लगाव का कदाचित् यही रहस्य है। हमारे आदि कवि और आदि काव्य के शुभारम्भ का श्रेय भी पक्षी को ही है। क्रौंच के सद्यः वियोग-प्रसूत क्रंदन से ही दयार्द्र होकर आदि कवि वाल्मीकि का शोक श्लोक में परिणत हो गया।

मा निषाद प्रतिष्ठां त्वमगमः शाश्वतीः समाः।
यत्क्रौंचमिथुनादेकमवधीः काममोहितम्।

भारतीय साहित्य में अधोलिखित पक्षियों ने मानवीय भावनाओं को अपनी ओर अधिक आकृष्ट किया है:—

चातक, चकोर, चक्रवाक, शुक, सारिका, हंस, मयूर, कोकिल, हारिल, सारस, कपोत, कुररी, काक, नीलकण्ठ, कुक्कुट और खंजन। फारसी से प्रभावित साहित्य में बुलबुल पक्षी भी हमारी अनेक भावनाओं का अधिकारिणी रहा है। इनमें से अनेक पक्षी अब केवल साहित्य की वस्तु रह गए हैं। हम उन्हें जानते-पहचानते नहीं। कुछ नामों का संबन्ध तो हमने ऐसे पक्षियों से जोड़ लिया है जिनका वस्तुतः उनसे कोई संबन्ध नहीं है। आइए, हम आप का इनसे ठीक परिचय कराएँ।

चातक—कुछ लोग चातक और चकोर को एक ही पक्षी समझते हैं और अन्य लोगों की दृष्टि में चकोर और तीतर में कोई भेद नहीं है। किन्तु ये धारणाएँ भ्रामक हैं। चातक चकोर और तीतर; तीन विभिन्न पक्षी हैं और आपस में इनका कोई संबन्ध नहीं है। अब हम इनके विषय में पृथक-पृथक विचार करेंगे।

अमर कोश में चातक के पर्याय दिए गए हैं—सारंग, तोकक और चातक, 'सारंगस्तोककश्चातकः समाः'। हिन्दी में इसे पपीहा कहते हैं। उपरिलिखित तीनों ही शब्दों से 'पपीहा' शब्द व्युत्पन्न नहीं हो सकता। फिर पपीहा शब्द की व्युत्पत्ति कैसे हुई यह विचारणीय विषय है। भाषा-वैज्ञानिकों का विचार है कि कुछ शब्द अनुकरण के आधार पर व्युत्पन्न होते हैं। अंगरेजी का कोड़ावाची शब्द 'ह्विप' इसलिए बना कि कोड़े को फटकारने से 'ह्विप' की ध्वनि उत्पन्न होती है। 'टिटिहिरी' पक्षीवाची संस्कृत का 'टिट्टिभ' शब्द इसलिए बना कि टिटिहिरी पक्षी 'टि-टीव्-टि-टीव' की ध्वनि उत्पन्न करता रहता है। मेरे विचारानुसार 'काक' शब्द इसलिए बना कि 'कौआ' 'का-का' की ध्वनि उत्पन्न करता है और 'कुक्कुट' शब्द इसलिए कि ताम्रचूड 'कु-कुट्-कुट्' की ध्वनि करता है। 'दहियल' पक्षी (महरी) के नामकरण का कारण भी यही प्रतीत होता है कि वह दही-दही, पुकारता रहता है—

'महरि पुकारै लेइ लेइ दही।' (जायसी)

मेरी ऐसी धारणा है कि 'पपीहा' शब्द की व्युत्पत्ति का भी यही आधार है। लोक भाषा के कवियों ने उसकी बोली में 'पीहू' अथवा 'पीहा' ध्वनि का आभास पाया है। देखिए—

'पीहू-पीहू' करण री बुरी पपीहा बाँण।
थारो सहज सुभाव औ म्हाँरे लागै बाण॥ (राजस्थानी)

तथा—

'सजनी सदन सून सुन्दर साजन सों सावन न सोहावन लागै,
मोकहूँ अधिक भयावन लागै ना।
अमराइन में बिरही पपीहा,
नित रटत रहत 'पीहा-पीहा'
बोलत है मधुर बोल 'पीहा'।...आदि। (मीरजापुरी कजली)

यही 'पीहा' ध्वनि 'पपीहा' शब्द की व्युत्पत्ति का आधार हो सकती है। इस 'पीहा' शब्द में 'प' वर्ण का योग बारम्बार 'पीहा' अर्थ का द्योतक जान पड़ता है। जैसे जो अनेक बार 'झुन-झुन' ध्वनि करे वह 'झुनझुना'; जो अनेक बार 'पी-पी' ध्वनि करे वह 'पिपिहिरी'; इसी प्रकार जो अनेक बार 'पीहा-पीहा' ध्वनि करे वह 'पिपीहा'। लगता है यही 'पिपीहा' शब्द धीरे-धीरे 'पपीहा' शब्द में परिवर्तित हो गया। बोलियों में यत्र-तत्र 'इ' स्वर का 'अ' में परिवर्तन दिखाई पड़ता है जैसे अंगरेजी शब्द 'इंजन' का बोली में 'अंजन'। संभव है 'पि' भी इसी प्रकार 'प' में बदल गया हो। इस शब्द का रूप बप्पीहा (अपभ्रंश), बाबहिया (राजस्थानी), बाबीहो, पपीहा, पपइयो, पपइया, पपिहरा आदि भी मिलता है।

चातक के विषय में दो कवि-प्रसिद्धियाँ हैं—

(१) यह केवल स्वाती नक्षत्र में वर्षा की बूंदों का जल ही ग्रहण करता है। अन्य जल कभी नहीं पीता।

(२) यह बादलों को 'पी कहाँ', 'पी कहाँ' कह कर पुकारता है।

आइए, पहले हम वस्तु-स्थिति का विचार कर लें, फिर कवि प्रसिद्धियों के विषय में विचार करेंगे। चातक नीलकंठ से कुछ छोटा हरित आभा लिए हुए मटमैला सा पक्षी होता

है। प्रायः इसकी लम्बाई साढ़े पाँच-छह इंच होती है। इसकी निवास-भूमि विशेष रूप से उत्तर और मध्य प्रदेश, पूर्वी भारत तथा मलाया प्रायद्वीप है। वर्ष में दो बार यह रंग-परिवर्तन भी करता है। वर्ष के आधे भाग में इसका रंग हलका हरा और आधे भाग में हलका काला हो जाता है। यह कीट-भक्षी पक्षी है। इसका स्वभाव कुछ समाजभीरु और संकोची व्यक्तियों जैसा होता है। अपनी लज्जाशीलता के कारण यह प्रायः ऊँचे पेड़ों पर पत्तों के झुरमुट में छिपा रहता है। इसकी बोली सुन कर यदि कोई इसे देखने का प्रयत्न करे और इसे ज्ञात हो जाय कि मुझे कोई देखना चाह रहा है तो यह मारे लज्जा के बोलना बन्द कर पत्तों में छिप जाता है। इसी कारण इसे बहुत कम लोग पहचान पाते हैं। यह तथ्य कम ही लोग जानते होंगे कि यह पक्षी भी परभृत है। चातकी 'सतभई' अथवा 'सतवहिनी' नामक पक्षी के घोंसले में मई-जून-जुलाई के महीने में प्रायः तीन अंडे देती है। भोजपुर क्षेत्र में 'सतभई को प्रायः 'चरखी' के नाम से पुकारते हैं क्योंकि यह चरखे जैसी ध्वनि उत्पन्न करती है। कहीं-कहीं इसे 'पवई' भी कहते हैं। यह भी खाकी रंग से मिलते-जुलते रंग (Drab Colour) का कीट-भक्षी पक्षी है और प्रायः छह-छह सात-सात के समुदाय में रहता है। कोकिल को तो संस्कृत में 'परभृत' कहा जाता है पर चातक को नहीं। कदाचित् लोग इस तथ्य से अनभिज्ञ थे।

चातक (पपीहा) में घन की अनन्य उपासकता के आरोप का मूल कारण इसकी लज्जाशीलता और मधुर वाणी हो सकती है। अपनी आह्लादकारिणी वाणी के कारण यह पक्षी लोक-प्रिय हो गया है। यहाँ तक कि लोकभाषा के कवियों ने इसकी वाणी में 'पी कहाँ' की ध्वनि सुनी। इसकी अदृश्यता ने यह कल्पना उत्पन्न की कि यह जल पीने के लिए भूमि पर नहीं उतरता, अथच यह घन के अनन्य प्रेमी-रूप में गृहीत हुआ। अब एक प्रश्न यह रह जाता है कि यह स्वाति-जलपायी के ही रूप में क्यों कल्पित हुआ, इसका कारण स्वाती के जल की अलभ्यता और महत्ता ही ज्ञात होता है। स्वाती नक्षत्र का भोग-काल आश्विन शुक्ल अथवा कार्तिक कृष्ण पक्ष होता है। इसी समय शारदीय शस्य के अंकुर उगते रहते हैं। इस समय वृष्टि की अतीव आवश्यकता होती है और यह नक्षत्र बड़े भाग्य से बरसता है। अवधी किसानों में लोकोक्ति प्रचलित है कि—

एक बुन्न जो परइ सेवाती।
कुनबिन पहिरैं सोने क पाती।

स्वाती-जल की महत्ता के ही कारण यह कविसमय चल पड़ा कि यह सीप में पड़कर मुक्ता और कदली-गर्भ में पड़ कर कपूर का रूप धारण करता है। फिर इस लोक-प्रिय पक्षी को जो इतनी तल्लीनता से 'पी कहाँ' की रट लगाए रहता है क्यों न इस अलभ्य और महत्त्वपूर्ण जलपायी के रूप में ग्रहण किया जाता ?

बहुत प्राचीन काल से यह पक्षी जन-मानस को लुभाता आ रहा है। कवियों ने अपने विभिन्न मनोभावों को इसके व्याज से प्रकट किया है। संस्कृत का आत्माभिमानी अन्योक्तिकार इसे सामान्य बादलों से याचना करने का निषेध करता है। अपभ्रंश की विरहिणी नायिका इसी के साथ अपने हृदय का तादात्म्य स्थापित कर पाती है। जैसे वह रुदन कर रही है वैसे ही पपीहा भी। दोनों की अभिलाषा पूरी नहीं हुई—

बप्पीहा पिउ पिउ भणवि, कित्तिउ रुवहि हयास ।
तुह जलि मह पुणु बल्लहउ बिहुँवि न पूरिअ आस ।।

कभी 'पी कहाँ'-'पी कहाँ' बोल कर विरहिणियों के हृदय में स्पर्धा का भाव जागृत करता है। विरहिणी का तो एक ही प्रियतम है। फिर वह किस प्रियतम को पुकारता है—

पिउ मेरा में पीउ की रे तू पिउ कहइ स कूँण ?

वह विरहिणी को क्षण मात्र के लिए भी विश्राम नहीं करने देता। आँख लगी कि इसने पुकारा। इसी से वह इसे अपना ग्राम भी छोड़ देने के लिए कहती है। अन्यथा वह या तो अपनी कूक बन्द कर दे अथवा प्रियतम को ला दे। स्वयं जलती हुई ललनाओं को यह पापी क्यों जलाता रहता है? मूर्ख अपना आगामी जन्म भी बिगाड़ता है—

हौं तो मोहन के बिरह जरी तू कत जारत ?
सब जग सुखी दुखी तू जल बिनु तऊ न तन की बिथा बिचारत ।
सूर स्याम बिन ब्रज पर बोलत हठि अगिलोऊ जनम बिरगारत ।।

किन्तु वह सर्वदा जलाने वाला ही नहीं प्रतीत होता। विरहिणी का हृदय उसके साथ समत्व का अनुभव करता है। वही तो प्रियतम का अमृतस्रावी नाम लेकर उसे जिलाता है, अन्यथा वह तो कभी की समाप्त हो चुकी होती। यह विरही पपीहा धन्य है। पक्षी होकर भी यह विरहिणी नायिकाओं से श्रेष्ठ है क्योंकि वह कभी हार नहीं मानता। इसीलिए तो यह आदर्श प्रेमी आशीर्वाद का भाजन है—

बहुत दिन जियो पपीहा प्यारे ।
बासर-दिवस नांव लै बोलत भए बिरह जुर कारे ।

चातक का अटूट और अनन्य प्रेम भक्त जनों का आदर्श है। गोस्वामी तुलसीदास ने इस पक्षी को लेकर चौंतीस दोहे लिखे। बादल चाहे कितना ही बरसें किन्तु यह एक घूँट से अधिक लेने वाला नहीं है। इसका प्रेम ऐसा दृढ़ है कि मरते समय भी उसमें व्यवच्छेद नही होता---

बधिक बध्यो; पर्यो पुन्य जल, उलटि उठाई चोंच ।
तुलसी चातक-प्रेम-पट, मरतहुँ लग्यो न खोंच ।।

आधुनिक कवयित्री 'महादेवी' भी इससे तादात्म्य स्थापित करती हैं। वे तो इस चिर पिपासाकुल चातक को बादलों से जल का एक कण भी माँगने का निषेध करती हैं। हृदय की अमूल्य निधि अनुराग का भला विनिमय संभव है—

जिसको अनुराग-सा दान दिया,
उससे कण माँग लजाता नहीं ।
अपना पन भूल समाधि लगा,
यह पी का विहाग भुलाता नहीं ।
घन देख पयोधर श्याम घिरा
मिट क्यों उसमें मिल जाता नहीं ।
वह कौन सा पी है पपीहा तेरा,
जिसे बाँध हृदय में बसाता नहीं ।।

अपनी बोली से मानिनियों का मान भंग कराने वाला यह पक्षी केवल साहित्य का ही वर्ण्य नहीं रहा है। लोक कवियों का ध्यान भी इसकी ओर आकृष्ट हुआ। भोजपुरी कवि की वियोगिनी इसकी बोली सुन कर उन्मत्त हो जाती हैं और पुकार उठती है—

बीती हो कइसे दिनवाँ बरसाती।
चढ़त असाढ़ बदरिया अइलीं घेर लोय।
जुगुनू चमकै, बादर गरजै करै पपीहा सोर लोय।
सुन के बोली हियरा धड़कै तड़कै लागल सिनवां,
बीती हो कइसे दिनवाँ बरसाती॥ (मीरजापुरी कजली)

इस पर्यालोचन से ज्ञात होता है कि आदि से लेकर अब तक साहित्य तथा लौकिक जीवन में यह पक्षी हमारे अनेक मनोभावों का केन्द्र रहा है। अब तो हमारा जीवन शहरी होता जा रहा है। हम इस शर्मीले पक्षी को प्रत्यक्ष रूप से नहीं देख पाते, केवल साहित्य में ही देख पाते हैं, बोली चाहे प्रत्यक्ष रूप से भले ही सुन लें। आवश्यकता इस बात की है कि हम इन पक्षियों से अपना प्रत्यक्ष संपर्क स्थापित करने का प्रयत्न करें और इनका वैज्ञानिक अध्ययन किया जाए।

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This article deals with the problems of expansion in University Education in India, especially in Education for Science and Technology. The over-all stress on Science Education is not incidental but deliberate. Scientific and technological development in India will play a most vital role in bringing freedom from hunger and misery, which have scourged this fair land of ours too long. Indian Education needs a drastic orientation in favour of Science. Moreover, this is an almost Universal feeling in the world today. At the present day when the national frontiers are fast becoming obsolete and when interdependence is inescapable, references to achievements and plans in the educational field in other countries will present our objectives and practice in a better perspective.

Statistics of University enrolment in India given recently in our newspapers apparently fare well with the figures from the British Universities. Although the reports in some cases rightly warned that this was subject to reservations, such comparisons can be highly misleading. The Chinese poised for the 'great leap forward' began turning out crude 'steel' from outmoded furnaces and assured their comrades that in a matter of years China would overtake Britain in steel production. Now, we can count our swans and geese together and claim we have as many swans as our neighbours, but it does'nt take us anywhere. On the contrary, the false optimism and complacency it will give rise to, can be dangerous.

All those who come out of secondary schools and continue their studies are not university students. Senior pupils reading in secondary schools in one country may be on a level with university students of another. What about students who are in technical institutes where the standards are much higher than those of University education elsewhere ? In Germany

and in U.S.S.R. the "technicum" has less than University character ; yet what passes for University Education in many countries including India and the U.S.A. may not be something higher. The frontiers of 'University' and 'School' and institutes of Technical Education are attenuated and blurred.

The factors leading to a greater demand for higher Education are many, but the most important factor is perhaps the response to Technology. The first industrial revolution in Europe, say from the middle eighteenth to the early twentieth century, brought about the increasing use of machines and the employment of men and women and even children, in factories in vast numbers. Its Educational implications were a higher general literacy and some provision for Technical Education and training of an elementary type. Even at that time, as the history of expansion of Education in Britain shows, only grudgingly were concessions made by the aristocracy and the ruling class for the Education of the masses.

The second industrial revolution, more appropriately called the 'Scientific' revolution means the application of real Science in industry. It started only 40-60 years ago. To meet the new challenge Education has not only to give "techniques for doing things" but also "ways of thinking about things". Hence the increasing demand not only for better junior grade technicians but also for trained teachers and trained minds. Sir Eric Ashby has said, "The first industrial revolution was accomplished without the aid of the Universities, the second revolution had its origin in the Universities". In the face of severe competition from other Countries the industrial development in our Country cannot be but slow. We can stimulate it only if we do not remain contented with importing machinery and borrowing the technical 'know how'. We must undertake fundamental research in our Universities, or in advanced Institutes of Technology of University rank.

Even countries in the forefront of technological developments feel there is still greater need for progress. In America the President's Scientific Advisory Committee in a special

report submitted in December, 1962, on Graduate Training in Engineering, Mathematics and Physical Sciences said that if prompt action was not taken, the supply of superior Engineers, Mathematicians and Physical Scientists would not be adequate "for the successful fulfilment of vital national commitments". The road to progress is littered with the remains of those unfortunate peoples who rested on their oars or remained preoccupied with the pleasing but enervating graces of traditional learning. Of course, Education cannot be reduced to a matter of practical training dominated solely by concern for economic exigencies. The problem is to find a balance between the demands of the Technological Education without which the emancipation of vast numbers of people will remain an idle dream and the demands of humanism without which the fruits of economic developments will not be enjoyed. In India the imbalance would be corrected if we locked up our gods for a few decades and worshipped at the shrine of science and technology. Moreover, it is not correct to say that scientific pursuits do not liberate the mind of man. Mr. Chagla said in December, 1963, in his address to the All India Council for Technical Education that "the business of Engineering Education is no more narrow specialization in certain technical disciplines : it has a wider social significance in the modern world".

Indian planners say that by 1967, 60,000 Engineering graduates and diploma holders will be needed annually. Today we produce nearly 20,000 annually. Indian provision for Vocational Education at the secondary level is the lowest in the world : only 2.2% of pupils seek such Education as against 27% in other developing Countries. This has a direct relation with University Education too. Because if the alternative avenues are not available to the not-so-academically-minded pupils, all secondary school leavers rush to the Universities and create baffiing problems. In no progressive Country of the world the "Arts" faculties in the Universities are so crowded as in India. Very recent trends in the opposite direction are very reassuring.

Advance in democratic thinking, emergence of newer classes as claimant for enhanced social status, demands for equal Educational opportunity, need for many more highly qualified men to run new plants and factories—all these will contribute to the expansion of higher Education. But availability of finance will set limits to this expansion. At the Gulbenkian Symposium on research in the Universities, held in 1963, John Vaizey said that the expansion in University Education will be determined almost exclusively by the Gross National Production—the G. N. P. He said, "If Britain's economic barometer was set fairly high then higher education would prosper". The problem in India is staggering. Unless we turn out many more highly qualified persons to plan and run new industrial concerns the Gross National Production will not rise. On the other hand without a substantial and quick rise in the G. N. P. funds for University education will remain meager. It is a vicious circle. But dilemmas confounding as they are can be resolved by a well thought out strategy and a sustained effort to carry it through.

Nowhere in the world provision for University Education is considered enough. America is the richest country in the world and millions are spent on University Projects. But writing on Harvard University, Marcus Cunliffe said, "American reformers bewail the small sums that are spent on education. To the visitor so much is spent". In the U. K. there is similar criticism. It is said that the British Government spends £37 million on universities, £47 million for egg subsidies and £52 million for cereal subsidies.

To us in India the Government may answer back, and not without good reasons : where is more money to be found ? Should we not spend on defence, on the refugees, on agriculture etc. etc. Even if funds are available the claims of University, Secondary and Primary Education have to be reconciled. There are other very important questions : can the capital cost of University places be brought down ? Is there any wastage in University Education ?

Take the claims of the Universities and the Schools. Students of the History of Indian Education know, a similar issue was debated in India in the early XIX century. The so called Downward Filtration theory gave priority to higher Education in the hope that from the elite knowledge will filter down to the masses. But then it is always a harsh choice. Irrigating selected patches and creating oases in a vast desert is not very helpful; but limited quantities of water spread over vast arid tracts will be lost to all. Political consideration will bring the solution no nearer. An English politician raised the well known slogan to promote mass Education. He said, "We must educate our masters". In India, and in many other developing countries too where democracy is on trial, appalling illiteracy is a big drag. Liquidation of illiteracy means Educating our 'masters'. Equally strong is the argument that no democracy is successful if an intellectual elite is not there.

From the long range point of view demand for Primary Education is seen as a demand for 'consumer goods' and that for University, or Higher Education, for 'producer goods'. For example, in China where for many years the slogan has been 'perspire today and prosper tomorrow', Higher Education has been given top priority. An English professor who visited China in 1957 writes: "In the two previous years, total enrolment was increasing by nearly 2% a year in primary schools, 15% in secondary schools, and 40% a year in universities—evidence of the stress being laid on "producer-education" i.e. on Education intended to produce Educators and Experts". He adds: "There is a popular demand for the establishment of a school in every village and hamlet. Yet this is a demand for consumer goods; and wisdom would counsel concentration upon producer goods—that is, upon the higher stages of Education. It is, in fact, the latter policy which is being applied, as far as this is possible". This is perhaps an extension of the principle that is observed in the economic field, namely, the national savings should be ploughed back for industrial development and the stress should be on heavy industry. Indian

planners have adopted a flexible attitude and pragmatic approach rather than a doctrinaire stand.

Some of our assumptions about University Education have never been thoroughly examined by us. We still think of University teachers as "ivory tower" intellectuals engaged in lucubration, and quite far from the madding crowd. We talk in terms of pupil-teacher ratios, the halls of residence and amenities for students. Of course, an academician will need leisure and a quiet study; and a high pupil-teacher ratio is not in the interest of good University Education and social life and cultural activities for students must be properly organised. But these should not delay the expansion of University Education.

In this connection the remarks of some Western writers are refreshingly frank and highly significant for us. Alexander Busch on German University Education said, "William Von Humboldt, one of the patriarchs of the old University had demanded "solitude and liberty" for the scholar. There is however, scarcely anything like "solitude and liberty" in his sense to be found in the contemporary German University". In U. K. too, many do not want expansion of University Education to be held up because adequate funds for halls of residence etc. are not available. It has been pointed out by several writers that facilities and amenities available to students in the past when the country needed only a very small elite should not be considered indispensable to University life.

The Sorbonne University in France is one of the oldest and most famous Universities in the world and in no way lacking in hoary traditions of learning and scholarship, and yet has never had the tutorial system, the staffing ratio or the residential facilities which are characteristics of Oxford. The staffing ratio in British Universities at present is under 8, whereas in France in 1957 the ratio was 1 : 50 in Arts, 1 : 53 in Science and 1 : 123 in Medicine (In India it is 1 : 17). Attempts to have British or German type of seminar work are being made. A tutorial group in the Sorbonne sense may have 40 students. Yet French University standards are very high. Student

unrest is unknown. In India we often hear people saying that in residential Universities where small tutorial groups meet the professors, student-indiscipline will be unknown and failures will be low. May be, but countries with a developing economy will take a long time to create such conditions. In German Universities the students can move from University to University and have only a little tutorial work. They have only to present themselves for examination when they are ready at the end of four years. Attendance is never compulsory and the academic year can be made a long vacation. Yet, German Education is inferior to none. Of course, the Indian Educationists do not make unreasonable demands when they ask for this or that facility for University students. But these demands should not hold up the progress of Education. In many cases frills are pushed forward as necessities. It is a legacy of the past. We still look to Britain for our models and ideals. But the Britishers never encourage this. An English visiting Lecturer in the West Indies writes, "A colony tends to assume—or retain—some of the narrower, more provincial, features of the society from which it has freed itself". It has been estimated that when the target of 1000 students is reached the University College at Ghana will have cost to that small emergent nation not less than £10,000,000.

In 1948 there were 20 Universities in India and the student population was 2,40,000. In 1961/62 it was 11,56,000, i.e. about 5 times. There were 29 Universities at the beginning of the first 5 year Plan we have 60 today, with more than 13 lakhs of students. How enormous is the problem can be seen from the increase in the number of those who pass the High School Examinations in India. Between 1957 and 1962 alone the number went up by 100%.

As regards Professional Education, the number in Agriculture has gone up 8 times, Commerce 6 times, Education 8 times, Engineering and Technology 8+times, and Medicine 5+times. The figures given below pinpoint the advance in the field of Technology

	1st degree institutions	Enrolment
In 1950	49	4,000
In 1963	126	20,000

Encouraging as it is, the advance is far from satisfactory if we remember that we have much leeway to make up.

In some countries the policy is to concentrate on Science and Engineering; because they believe that for a developing economy this emphasis is over-riding. In 1959 the figures of graduates trained per year (Scientists and Engineers combined) were (roughly): U.K.—13,000, U.S.A.—65,000, U.S.S.R.—1,30,000. The figure for the Soviet Union was much larger than for the rest of the world put together. It must be added that some top ranking Scientists and thinkers felt they were "overdoing the number of Engineers they are training".

But a comparison with an Asian Country like China would be more appropriate. Mr. Humayun Kabir said in September last year: "Inadequate attention to fundamental research might in the long run affect progress; but the emphasis on practical and applied research had certainly paid China short-term dividends."

	Persons with University degrees	Engineers
China	125,000 in '50	21,000 in '50
	700,000 in '60	210,000 in '60
India	350,000 in '50	30,000 in '50
India	1,000,000 in '60	100,000 in '60

Mr, Kabir said that India started with a distinct advantage and was still ahead of China. But there was a "definite risk", and he pleaded for an increase in allocation for Scientific research from .3% to 1% at least.

Let us see how others spend money on research:

U.S.A.	2.8% of the Gross National Product
U.S.S.R.	2.8% in 1960
	.6% in 1940
China	1.54% in 1960
	.02% in 1940
India	.2%

Expansion of University Education and wastage should be considered together. Dr. Kothari gave these figures for 1961 examinations :

Subject	% failure
B.A.	53.6
B.Sc.	54.7
B.Sc. (Tech.)	16.3
M.B.B.S.	43.8
B.Sc. Engg.	26.0

The results of 36 universities for examinations in 1963 show only a slight improvement. For example, for M.B.B.S. the % of failure in 1963 is 37.5 as compared to 43.8 in 1961.

The "high failures" is not the only cause of wastage. What about those who do graduate ? While efforts are made to expand University Education, we have to avoid the loss of trained men, especially scientists and professional men, in all other ways. One is the flight of specialists to other countries. In India it is not a very serious problem perhaps ; nevertheless, the government has to be very vigilant. A register of scientists abroad was maintained. About 8000 Indian scientists were outside India. About 50% according to Mr. Kabir's statement, have come back. Six hundred returned every year. A "pool" of scientists in India has been set up so that qualified persons on the register get a reasonable pay from the central government till they are absorbed in suitable vacancies. India is not the only country to face a problem. The continued flight of trained specialists from U.K. to America made Lord Hailsha say last year, "They (Americans) are compelled to live parasitically on the brains of other nations". Besides Britain, other countries have to take steps to stop the loss of specialists. Nearly 80% of the advertisements from America were rejected last year by the Ministry of Labour in West Germany. Norway forbids that too. Japanese and Indian scientists are employed also in U.S.A.

Even inside the country scientists and technological specialists are lost to the nation and thus the good results of expansion in Higher Education are nullified. According to a

survey of 60,000 General Science graduates, conducted by the national register of the Council of Scientific and Industrial Research in India on the basis of the data in February, 1961, 13% of the graduates appear to be wasted through Unemployment and 42% through non-technical employment. Several hundreds of them do not accept the jobs that are offered, in many cases, because they do not want to move away from the urban areas. In some countries, for example, the Soviet Union and France, University students are given aid by the State, but they have to sign a bond for a period of service.

Because there are not enough University places, almost everywhere admission to a college is a very big problem. The Entrance Examinations to higher education are fiercely competitive. In Japan, Germany and U.K. allocation to different schools, or selection, is based on very high standards. Everywhere we find severe screening and elimination tactics. In Britain, most Universities nowadays have far too many applicants for each place. Moscow University had 8000 qualified applicants for 2800 vacancies in 1957/58. In some cities one-third of the candidates fail to get in the University. In France, an eliminatory or preparatory year has been added to fend off one half of those who have passed the already very very tough 'baccalaureat'. Only in the U.S.A. and in our country it is not difficult for school leavers to get into Universities. The average I.Q. of University students in Britain, according to Eysenck is about 127, whereas in U.S.A. it is 110 and in some colleges it is below the average intelligence for the whole country. But Americans can afford all this and are contented, because they think, at least a little Education will be rubbed on the young people. The 'wastage' is not so galling. But to give easy access to Universities in India is, for us, too costly an affair.

Those who fall for short cuts suggest that the riff raff should not be allowed to join Universities and Colleges. But this is simply an over simplification. To say that 'abler' students should be selected is only to beg the question. The abler ones

are not always those who do very well at the University Admission Examinations.

It is a large question and needs a long discussion. It may be suggested that there should be a liberal provision of scholarships in Schools and Universities, so that those who can pay are not the only ones to get into colleges. Secondly, at the secondary stage pupils who should not go for University Education may be diverted to the professional, semiprofessional and vocational sides. But this diversification of courses in schools can be achieved and made popular only if there are ample avenues of employment for those who are denied access to Univesity Education. Hence the great need for urgent and intensive industrialization in India.

THE SPIRIT AND FUNCTION OF LITERATURE

G. D. SHASTRI

True literature is that which arouses man's interest i a general way and demands no other qualification for its appreciation than his abiding curiosity in his fellowmen, and that without prejudice to any knowledge he may have of the world. It does not seek to study the world in a regimented manner, nor does it concern itself with what might be described as mere advancement of thought. It is but the imaginative exercise of language in the presentation of man or Nature in a manner that is delightful, general, and undogmatic. The criterion for literature is not simply the utility of books, for more useful books lie outside its pale : nor is correctness, or preciseness, or truth of knwowledge any more its trait, for what literature, may represent may never be accepted as the demonstrably established truth, or the reality of things. Such knowledge falls outside its scope. Literature is not the objective study of things done with a view to finding out their nature and reality. Nor does it seek to study man or life from any definite scientific point of view, so as to arrive at any empircal truths about them, which when, once correctly established, are incontrovertibly final. Any book seeking to be merely useful or scientific in this sense do not come within literature, which is the name of only such writings, whose chief aim is the entertainment of mind which language can give with the aid of imagination. The distinguishing factor between *Science* and *Literature* is the use they make of speech. For Science, speech is only a medium for the recording and communication of true knolwedge, its function and value are limited to supplying such knolwedge with a token that can give it a permanent form. Not so with literature. Language assumes a greater importance here since literature seeks to impart delight as a result of the skilful use of words. It does not aim at merely imparting useful or true

knowledge. It is primarily to excite pleasure, to evoke a feeling of joy, that language is exercised in literature, as contradistinguished from Science where factual *truth* is the objective. This gives a distinct bias to literary books which are no longer mere accessories to knowledge. Their aim is the excitement of a feeling of joy in consequence of whatever is communicated through the medium of language. That this delight is experienced from a reading of literature is never denied : what however may create a difference of opinion is the nature or mode of such pleasure. What then is the kind of pleasure that one can reasonably hope to derive from it ?

The ultimate aim of all our efforts is to secure happiness. As Indian philosophers have said the ultimate quest of humanity is for peace and happiness resulting in freedom from pain and misery. Nothing that causes pain is liked by us nor any thing that seems to afford us relief or joy is disliked. Man's constant effort is to eliminate pain and secure happiness. Literature through which the human intellect finds a channel for expression is the supreme test of human endeavour for the attainment of this joy and peace.

And since permanent joy need not be confined to any feeling of pleasure caused by temporary excitement, literature to be abiding aims at more lasting effects than might be presumed otherwise. It is the perennial and constant joy and are not the ephemeral and momentary which literature seeks to impart, and this it does by remaining true to its chief function-viz., verbal pleasure through an imaginative presentation of man's varied life. As in other things, so also here, the success of any piece will rest on its capacity to afford this restful joy.As a matter of fact the delight that literature gives is in the nature of a comfort or a soothing balm which allays our racking doubts and uncertainties. The value of literature arises on account of the sustenance that it affords to the hungry soul of man. In reality literature as such satisfies a craving of the soul for peace. But it does not follow from this that every piece of literature is produced with the deliberate aim of affording such joy to

man, or that the conscious aim of every writer is to dissipate human misery and bring to fellow creatures the bliss that they need. Such a view would be far from reality. It need not be the conscious and deliberate attempt of any writer to convey through his work any such message of hope and comfort. But the cumulative body of literature in any language reflects this tendency. The basic condition that literature must fulfil is that it should not be confined to time or place in its power to move our hearts. On the other hand, its appeal is permanent and universal. This never failing interest that it excites in man is not due to any reason in particular, except its fundamental character to be true to itself.

Literature is an outlet for the imaginative energy of man seeking to forge an instrument for intellectual pleasure ; and as this is done in different ways by diverse hands, literature grows in extent and volume. Individual writers occupy themselves with the task of presenting what to them appears as a picture of life drawn from real or imaginary experience : Since this is all that one can do in literature with the aid of language, where the delight so enkindled is the motive force of creative activity, as also of the responsive interest of others in it. The author writes out of some kind of urge for self expression and whatever the inducement the object is nothing else than a general kind of delight so communicated. The communication of pleasure can be admitted as the last motive of literary writing even if it may not be its immediate or first cause. The pleasure however need not be of the obvious kind. As a matter of fact, mere satisfaction of the senses which pleasure ordinarily is supposed to bring about does not flow from literature. From its very nature the study of literature is an intellectual feat and consequently it is the entertainment of the mind that it seeks to achieve. Intellectual recreation to be complete and full must conform to certain ideals which man holds dear. At the same time it must move his whole being and not excite his surface fancy. A momentary thrill caused by accidental phenomena and not deep-rooted in essentials is hardly satisfactory.

No human being ever remains the same in mood, thought or feeling, which depend on external causes: what therefore may appear as delightful now may with the change of circumstance and condition convert itself into something quite different. The quality of literature should not depend on changing factors like these. It requires deeper and abiding qualities of a permanent nature. This call of the '*permanent*' determines its basic content and its literary presentation. Since it aspires to be a source of delight for all time and for the intellect of man, true literature shuns all that is trivial, low and degrading. For such '*low*' things do not move all beings for ever, even if they, for any particular reason at any moment, excite the fancy of a number of people.

Man's literary fancy has, therefore, moved always on the side of the beautiful, noble, grand and heroic. The urge to make the call of art also subserve the call of the spirit has always been the ideal of literary effort. The perceptible effect of this deep-seated social instinct may not be always clear or be but manifest in only partial forms; but the seed is there: and the blossoming of the literary tree is only conditioned by the social evolution of man, the growth being helped or retarded by externals. In any case literature opens out in an atmosphere of heroic idealism: man trying through its means to build up an ideal state for himself. Such a representation of life depends for its very existence on the impact of environments on man's mind. Basically, man's mental vision or picture of life is but the reflex of the prevailing conditions of life and his desire to modify the same in accordance with his needs or aspirations. It is not easy for man to live down the hard realities of physical existence and the struggle for life determines the extent and the range of his intellectual excursion in the world. Without being dogmatic it can be safely asserted that literature is the outcome of man's growing out of the existing conditions of life into the freer atmosphere of imaginative idealism. Earlier art is motivated and conditioned by this kind of feeling—it is a kind of a day

dreaming, but the dream is only the focussing of the day-to-day activity of man trying to create a better world.

All art, therefore, is only an attempt to find a way out for the *self-expression* of man in response to his desire to attain perfection. Man's evolutionary march is a continuous process and the steps that he takes in moving forward include his efforts in art and literature. These embody his vision and dream of himself, his hope and desire, his picture of life. And since the existing falls far short of the desired reality, man seeks the aid of literature to make good the deficiencies of life. Romance helps him to rehabilitate his frustrated passions and provides him with a very easy means of vicarious self indulgence. Through it man spins a dream world where passion goes its way in an unrestricted manner and free of limitations of life. Heroic poetry is man's projection of himself in the field of valour and courage. Man's social instinct is the most powerful instrument of human endevour: and every effort which he makes is the outcome of his desire to live. The springs of activity are hidden in our thirst for life, and all that we do arises out of this unfailing will in us for existence. This *will* felt by each of us individually moves us towards collective living resulting in the creation of the group, the community, and the clan, and finally in the emergence of a corporate social body where the common good over-rides individual considerations.

A kind of a social *will* comes into existence, impelling each and all by its force and making individuals think not in terms of single units but in terms of all. This marks the beginning of civilized life, and literature is man's direct means of social solidarity and life. Human imagination and experience come into play and by the magic of language man begins to entertain himself and others with stories and pictures of life centring round himself and reflecting the interplay of all that he sees and observes round about him and all that he desires to have and possess. His self-expression moves ever thus between the

reality of experience and the dream of desired eventuality. Man's longing for a happier and well adjusted existence for himself and all fellow units of society compels him to seek through literature his dream for such a consummation. Literature in this sense becomes the focal point of man's *vision of himself* as he *not only finds himself, but wishes*, to be.

At the same time there can be no questioning of his rights if he embarks upon a campaign of social regeneration through his art: nor can it be denied to him that he is perfectly within his duties in making his *art subservient to any higher needs of civilized and cultured existence*. In fact cultural advancement should be one of the boasted benefits of literary art. To concede to literature the claim that it should be the means to ameliorating the conditions of life and bettering the lot of humanity is but to acknowledge how rapidly the world in recent centuries has changed from the *ideal of kingship* to the rule of *the many*, from the age of the privileged oligarchy to the times of the enfranchised masses. The interests of a few are no longer permitted to thwart the well-being of the many. In the democratization of society that has followed in the wake of the *equality of man*, the question of keeping literature *confined* to the aspiration and feeling of the upper few is no longer permissible: literature must not only take within its purview the lower and lowest segments of humanity, it must also direct itself towards bringing about the improvement in their lot. The march of civilization has been in the direction of equalising opportunities for all, in bringing about an evenness in the social status of man and the abolition of classes.

For whatever might have been in the past the present has moved much too far in democracy to allow itself to neglect the welfare of the masses through the medium of the most effective instrument of propaganda viz...*literature*. Even if it were tried to keep literature away from becoming propagandist it would not succeed for the inherent urge behind the use of language has always been social, and the reflex of a desire

to live as a social unit on the part of man. If literature in antiquity or the mediaeval ages has appeared as remotely connected with the masses in its reality, that has not been due to its idealistic nature as might be supposed; but to the fact that the conception of man regarding 'social progress' had been narrower and exclusive than at present. The incentive to literature remains much the same, only the purpose behind becomes better defined and well directed with a growing clearness of social needs. Also the scope and intensity of literary effort become wider and greater. Changes in the material conditions of life that have reduced differences between men and removed distances, have contributed to the promotion of the basic unity of man. Moreover, the disposal in the hands of the literary artist of modern resources in the matter of publicity and circulation cannot but have its own effect on the use to which literature is put. Taste is not only a matter of cultivated judgement : it must depend on other factors such as the usefulness of art, its capacity to increase our sense of pleasure, and its effect on general well being. The practical bearing of any piece of writing on the mind is never negligible and is never ignored. Only with advancing time the tone and tempo of literary representation change to suit the varying demands of the differing ages.

In the ultimate analysis literature serves to afford us intellectual enlightenment along with pleasure. It delights and educates us as well. The one is as much its effect as the other. But since social awareness fluctuates from age to age both in meaning and emphasis its form seems to vary. In a way, it is so : but on closer study it would be found that the spirit underlying all literature is unchanging. In the first place literature comes into existence only as a result of man's delight in the skilful use of language. This is undertaken by man only in response to his social instinct and as such the basic urge behind it is always man's desire to evolve a flexible and lasting

medium of self-improvement. All art has behind it the urge to give life a better tone and to enable man to make a better job of it. Literature being more plastic and mobile, is more fitted for this task of making human progress easier and delightful.

The seeming correspondence between the projected picture (of life) in literature and the existing reality in the world of man as in realism, is only the clear and conscious manifestation of the '*social*' soul of literature. Classical art with its stress on perfection, on the presentation of an ideal is not the rejection of the principle of reality in art. It is only the other side of the picture: only the other way of looking at life and making it worth while. It cannot be said that such an attitude does not meet with all the demands made on literature. The apparent social need at any time may only be a little local affair, created by certain temporary factors and circumstances. Such local factors are many and cause a number of problems to arise. The aim of literature ought to be to awaken in man *a sense of reality that he is, to make him understand what makes life beautiful and noble, to create and foster in him all those feelings that unite the world into a single family*, in short to raise him out of himself into a higher plane of thought and feeling. Literature is only a means to an end. It only seeks to realise that end which is to shed away from his daily life all dehumanising impulses and debasing thoughts by presenting before him ennobling pictures of manhood.

Realism and idealism are only two modes of approach: the one is the inverse of the other. The grim earnestness of the first with its insistence on a photographic imitation of the conditions of life as they subsist at any time becomes packed with meaning only when its objective and aim are to make a fight against all that is ugly, bad and corrupt. To rouse the evil in us by a fascinating treatment of the seamy side of life is only to produce '*gutter*' literature. The urge behind realism in art is also to give a phillip to this instinct of good in us by

making us sensitively distressed at the sight of what is truly painful or disgusting. To ignore it will be only to make it more permanent and lasting. By focussing our attention on these realities of existence the task of making life better becomes easier as the urge for improvement is quickened. Pictures of the ugly, wretched and miserable aspects of life in all their real vividness when dressed up in literature can lead to a searching of heart and thus pave the way for change. Realism thus only makes facts tell their own tale, and its purpose is not on that account different from the idealist's point of view.

Changing social conditions are accompanied with changed problems which clamour for solution : and many of these can be effectively dealt with through literature and there is no reason why this should not be done. The only over-riding consideration is that the perennial charm of literature is that it subsists only on its essential *universality.* Temporary questions howsoever pressing are bound to fade away in course of time and give place to the new. There can be thus no permanence in their importance or value, and once the local conditions that have given them birth and added to their importance are removed they vanish into the air : They have little strength of their own to stand on their own legs. Such being the case, realism, where it too closely follows the external facts of life as they exist takes a natural risk with time, and though it may get temporary popularity, it may not be long before it loses its hold. What is true only of a time need not remain true for all times, and social problems which inspire realism do not maintain emotional uniformity or strength of appeal to all.

Not the evanascent but the everlasting, not the fleeting but the ever persisting, not the flash of the lightning but the steady light of the Sun, that is the nature of beauty in art. It is not composed of the trivial and the trite, nor of the temporary and of the moment. Its power is not confined to any particular time. Literature dominates and influences us only by virtue of its intrinsic powers and everlasting appeal. And

what endows it with this power is not anything of a temporary sort arising out of the momentary issues of the hour, however important in themselves but of a kind inherent in the very nature of art. For this reason, literature's sustenance is drawn not from what is momentary but from the more *abiding quality of its power to make us feel the depth of our own soul.*

DIRECTIVE PRINCIPLES OF STATE POLICY A REVIEW

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The inclusion of the Directive Principles of State Policy in the constitution of India under Part IV, Articles 36 to 51, is "a novel feature in a constitution framed for Parliamentary Democracy", so said Dr. Ambedkar, the Chairman of the Constitution Drafting Committee of the Constituent Assembly. Novelty it might be for a Parliamentary form of Government, but not a monopoly of the Indian Constitution, nor even an indigenous product. The framers of the Indian Constitution while writing the Directive Principles of State Policy were influenced more by European Constitutions rather than deriving inspiration from the Constitutions of the Commonwealth Nations or from the Ancient Buddhists Republics in India. The Constitution of the Irish State incorporates such 'principles' and earlier to it the Spanish Republican constituion had embodied similar principles—pious aspirations in a legal document. The Indian constitution has incorporated some principles from these with modifications to suit the condition of the country.

Reasons for their inclusion :

On the authority of Prof. K. C. Wheare, it can be said that "an appreciation of the difficulties which arise if courts are asked to enforce or apply declarations of rights in a constitution has led sometimes to a decision by the framers of a constitution that the declaration of some rights at any rate shall not be regarded as a collection of rules of law in the sense that courts are to be asked to recognise and apply them, but rather as a statement of desirable objectives". The fathers of the Irish and Indian Constitutions followed precisely this plan. The framers of the Indian Constitution had the idea that it would

be good to reaffirm and write in detail the 'classical liberties' and a 'declaration' of the "objectives of the modern welfare State and the economic means of attaining those objectives". Such a thing is not peculiar to Indian minds but International Charters also accept it. Such mentioning of the principles in the constitution invests them with "a particularly solemn sanction and status" and constitutes a pledge that the policies of the State would be consistently directed towards the achievement of the objective of the welfare state.

Article 45 of the Irish Constitution deals with the "Directive Principles of Social Policy" and it is expressly stated at the very outset that the principles set forth in it are intended" for the general guidance of the legislature". 'The application of these principles in the making of laws shall be the care of the legislature exclusively, and shall not be cognizable by any court under any of the provision of the Constitution'. The Indian constitution also incorporates similar provisions under Part IV, though with a significant difference. In the Irish Constitution these principles are called "Social Policy" and they are for the guidance of the legislature only, while in the Indian Constitution, as an improvement over the Irish one, they are for the general guidance of the "State" which includes, legislatures, executives, and other institutions of the local-self government, administrative officers, and they are called "Directive Principles of State Policy". Thus, it is to be noted that these directives are morally binding on all the organs of the Government but not upon the Judiciary. This is for the simple reason that they are non-justiciable rights or rather they are social obligations on the part of the 'State'. Even then the Supreme Court and the High Courts have taken into cognizance these principles of state policy while delivering judgements on social and progressive legislations. In the words of Mr. M. C. Setalvad, former Attorney General of India, "These fundamental axioms of State Policy, though of no legal effect, have served as useful beacon-lights to courts. It has been held in the context of the Directive Principles that legislation making the land resources of the country effectively

available to the larger mass of the cultivating community is acquisition of the lands for a public purpose. Restrictions imposed by laws on the freedom of the citizen may well be reasonable if they are imposed in furtherance of the Directive Principles. Thus, these principles have helped the courts in exercising their power of judicial review". (Speech from A.I.R. 1954). This fact has been upheld by a good number of judicial decisions also, namely, (*a*) Bijay Cotton Mills *v.s.*, The State of Ajmer—1955 ; (*b*) The State of Bihar *v.s.* Kameshwar Singh—1952 ; (*c*) Arjan Das *v.s.* The State of Punjab—1958 ; (*d*) Jugal Kishore *v.s.* The Labour Commissioner.

Further, true it is, that these Directive Principles are not justiciable and they can not be enforced by the law courts, yet as mentioned in Article 37 that they are "fundamental in the governance of the country". They are just like 'instrument of instructions' to the State. These directives enjoin the State Legislatures, Executives and all other organs of administration to make laws and to execute them in conformity with these principles. But this does not mean that the legislature and the executive can pass a law or can execute it beyond the constitutional competence. In order to implement the Principles the legislative and executive competence must be sought out from the legislative list and the Articles which clearly confer legislative power on them, though Dr. Ambedkar in course of the debate on the First Amendment Bill, had maintained that these Directive Principles conferred 'implied Powers' on the Legislature and the Executive. But this is not a widely held point of view. Even the Law Courts have not accepted the principles of the Implied Power. The fact seems to be that these Directive Principles do not add any more power to the legislature or executive organs of the State. The Supreme Court in a judgement on "The State of Madras *v.s.* Sm. Champakam Dorairajan" made it clear that "there can be no objection to the State acting in accordance with the Directive Principles of State Policy—subject to the Legislative and Executive Powers and limitations conferred on the State under different provisions

of the constitution". This might present some difficulty in the proper implementation of some of the Directive Principles. Legislative and Executive authorities might not find themselves constitutionally competent to implement some of the Directives. In such cases the Directive Principles would remain 'Dead Directives'.

The Directive Principles are not cognizable by the Law Courts, therefore, they are to be differentiated from the Fundamental Rights which are justiciable by the Law Courts. The Fundamental Rights mentioned under Part III of the constitution are individual rights and are "sacrosanct and not liable to be abridged by any legislative or executive acts". The Indian Supreme Court in the case, The State of Madras *v.s.* Sm. Champakam, has held that the Directive Principles have to conform to and run subsidiary to the chapter on Fundamental Rights". This seems to be the correct way in which the provisions found in Parts III and IV have to be read and understood. In case of a conflict between any of the provisions of the constitution and the Directive Principles the courts will have to give priority to the provisions of the constitution and not to the Principles—if the sanctity of the constitution is to be maintained and which must be maintained. (vide M. H. Qureshi *v.s.* The State of Bihar).

It is because of the subordinate position assigned to the Directive Principles of State Policy and their non-justiciable character that the British legal mind has criticised vehemently the whole chapter as 'meaningless generalisations', 'declaration of pious wishes', 'statement of 19th century liberal principles' 'and moral homely', etc. No one can deny the basic fact that these principles are merely 'a manifesto of our aims and aspirations' or in other words, general recommendations addressed to all authorities in the Union reminding them of the basic principles of the new social and economic order which the people of India aspire to achieve. They are declarations, no doubt, but they have been stated "to anchor the human rights of the welfare state in the constitution".

But it might not become a sheet-anchor if a political party, like the Communist Party, would come into power for which these principles are bourgeois principles, and hence, are not to be implemented. However, this is a remote possibility. But at present, the out-right condemnation of these principles is not just. They have their educative value. They have served as beacon-lights to the Law Courts. They have been a constant reminder to the State to establish a 'social and economic democracy' in the country. They have behind them the greatest force, i.e. the force of public opinion. Behind them stands the moral sanction of 460 million people.

Directive Principles :

The Directive Principles of State Policy can be summarised as follows : that 'the State in general is to strive to promote the welfare of the people by securing and protecting as effectively as possible a social order in which justice social, economic, and political would prevail in the national life. In particular, the State is to direct its policy towards securing for all the citizens of both sexes the right to an adequate means of livelihood, the ownership and control of the community's resources are to be distributed so as to serve the common good, to see that there would be no concentration of wealth and means of production which would be deterimental to the common people, to make equal wages for equal work irrespective of sex, to protect children and young persons from abuse, neglect, and exploitation, to protect labour from exploitation and to see that they work in a proper condition, to strive to raise the general standard of living, to provide proper public health facilities in order to improve the general public health, to provide for the sick, disabled and aged, to impart free and compulsory primary education upto 14 to improve and organise agriculture, to stop traffic in narcotic drugs, to attempt to separate judiciary from the Executive, to try to formulate a uniform civil code for the country, to protect ancient monuments and other places of historical importance, and finally, to follow in the international field, a policy of peace, to encourage arbitration

as a means of settling disputes, and to foster respect for international law and treaty obligations'.

Thus, these Directive Principles are very comprehensive, touching the economic, social, cultural, agricultural, educational, administrative, international and internal political life of the country. In the words of Prof. W. A. Robson, "this is probably the most complete and explicit statement to be found in any state document in any country of the fundamental aims and aspirations of the welfare State". But the leftists of the country are of the opinion that by implementing these principles India would be able to establish a sort of "regulated capitalism" and not a Welfare State or an economic democracy. They point out that in the Directive Principles there is no provision for the nationalisation by which concentration of wealth and the means of production can be stopped ; the Directives do not say anything about the way in which wealth is to be equally distributed. But it is not to be forgotten that most of the Directive Principles relating to economic and social matters are infused with the principles of Fabian Socialism and as Dr. I. Jennings has put it "The constitution expresses Fabian Socialism without Socialism." In fact, the Directive Principles have been a subject of theoretical controversy and the best way to understand their importance is to look into their practice and the way in which the State has been able to implement them during this short period of 14 years of the working of the constitution.

Directive Principles in Practice :

This short account of the working of the Directive Principles of State Policy makes us believe that India is generally marching towards its ideal of a Welfare State though with lapses and set-backs. Critics of the Congress Government would not accept it and the present rise in the prices of essential commodities and the talk-on-the-street of corruption might give an impression to some that in India a welfare State is only a dream. But on the other hand, the introduction of the three Five Year Plans and the Fourth on the way, the rapid industriali-

sation on the Country, nationalisation of railways, airways, fertiliser, and mines etc., the subsidy given to the development of cottage industries, establishment of a Welfare Board, the opening of a number of maternity centres, mobile clinics hospitals, rural health centres, medical research institutions, propagation of sanitation plans, provision for drugs and medical assistance (recently in New Delhi experiment is being made to provide free medical aid to all and it has proved a success), introduction of labour insurance scheme, passing of laws for the benefit of Labour, separation of judiciary from the Executive (in Bombay, U.P. Punjab, Madras and other states the process has already started) establishment of the Village Panchayats in U.P., Bihar, M.P., Rajasthan etc., protection and excavation of old monuments under the Government Archeological Department, introduction of free compulsory primary education in U.P., Punjab from 1957 and at a later date in some of the other states as well, and finally, acceptance of the Policy of *Panch-Shila* in the international field ; all these are clear indications that the present Government has tried to implement the Directive Principles as far as the economic and political conditions permit it to do. The country has advanced rapidly, the national income has increased, the standard of living has appreciably increased. Let us hope for the best. Prediction in social sciences is rather a dangerous step, let the time be the best judge whether by implementing them India attains economic democracy or a welfare State or as the Leftists say a "regulated Capitalism".

SCIENTIFIC RESEARCH AND DOCUMENTATION

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Librarian

[Explains the importance of Science and the growth of Scientific knowledge and research. Lays bare the lack of research facilities and the migration of Scientists to the United States. Gives a statistical account of the Scientists who have migrated to the United States from Asia and South America and even from the United Kingdom. Stresses the need for the development of a National Science policy and research facilities. Points out the ecological factors necessary for scientific research. Describes the condition of scientific research in India and the efforts of the Government and U.G.C. Mentions the financial provision for the improvement of research in the Fourth Five Year Plan. States the terrific growth of scientific literature and the difficulties in scientific research. Stresses the need for indexing and abstracting of micro-literature in the field of science and the emergence of Documentation. Defines documentation and the factors for its scientific development. States the phases of Documentation and evaluates the work of Documentation. Stresses the need for scientific approach to Documentation work by the Library profession. Describes the role of a University Library for the promotion of research. Evaluates the research output from Universities.]

1. *Growth of Scientific knowledge :*

The success and failure of a nation depends to the extent Science is applied to its needs. The terrific growth of Science has brought certain Countries much ahead of other Countries. The exponnential growth of science has become a well documented phenomenon. The intensity of Science calculated in terms of research work, recorded knowledge and the facilities for further research have been remarkable. It is stated that the scientific effort of USA has doubled in every ten years. In

Europe, the scientific effort has doubled about every 15 years since the mid 17th century. The Technological revolution of the present century has clearly laid emphasis on the exploitation of the scientific knowledge. Those Countries which have the intellectual power to exploit the new dimensions of science and apply it in creating the industrial and economic revolution, will remain economically and materially a better nation. It is for this very purpose that facilities for the exploitation of science is provided in several Countries. There is, however, the language barrier and other local environments which make the scientific growth and research difficult.

2. *Migration of Scientists :*

Scientists generally crave for increasing opportunities for more and more scientific research. If such opportunities are not forthcoming they feel disgusted and migrate to other Countries. A recent statistics of the scientists of other Countries working in the United States show that a substantial number of Scientists and Engineers have migrated from Asia and Sourth America. The figures are as under :—

Category	*Asia*	*South America*
Engineers	1,810	1,556
Chemists	231	213
Physicists	61	21
Biologists	40	47
Total	2,142	1,837

3. *Need for a National Science Policy :*

The employment of a large number of foreign Scientists and Engineers in the United States make this clear that the innate capacity of a scientist to excel himself is almost equal among the people of the world. Persons with aptitude for Science will come up in any society provided there are proper facilities for advanced training and research. There should also be an effective guidance. To have these facilities promising

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Students of science usually migrate to other Countries. Their number is more than those of the fully trained scientists. India is not an exception to it. It will be surprising to know that a percentage of scientists even from United Kingdom do migrate to United States. It has been stated that about 12 persons of the total output of Ph.D.'s in Science and Engineering and 7 persons of the total output have been migrating to the United States permanently. The reason being that "conditions in America are generally better simply because the Americans appreciate the importance of Science more than we do in Britain. This scale and balance of activity in higher education has been badly mismached in Britain to the needs of a technological civilization." Thus the growth of scientific knowledge and research is intimately linked with the National Science policy of a Country.

4. *Research Facilities :*

I am not going to state the measures that should be taken to attract a Scientist to do his scientific work within his own Country. But I would lay emphasis on the facilities that the Government, the organizations and the Nation should provide for their future work. It is stated that while Russia has produced 12 lakh science graduates and USA 9 lakhs, India has been able to create according to the National Register of Scientists, only 32 thousand Scientists. The average expenditures per student for higher education in UK is Rs. 5,000 while in India it is less than Rs. 500. But the number of failures in India are much larger than those in UK. There are still underfined objectives for research and in certain cases the research has been unproductive. Team-work for research and co-ordination of research work in the country are still not taking a concrete shape. 1/3 of research in UK is on Applied Sciences, besides the fundamental research that is in progress. Graduates of all higher Education institutions in Russia are promised work soon after they complete education. They are able to harness the energy and the knowledge of the student to a good purpose. But is it so in India ?

4.1. *Ecology and Scientific Research :*

Some Scientists urge on the development of ecological methods for scientific research. They urge upon the Governments to encourage and promote research in applied sciences, human sciences, and social sciences. This according to them goes to remove the imbalance existing between the speculative Sciences on one hand and biological and human Sciences on the other. Whatever might be the approach, it is imperative that scientific knowledge is necessary in almost all the subjects in the universe of knowledge.

4.2. *Condition in India :*

In our own Country, Government has given thought to this serious drawback in the Education of our Country. Efforts are being made to call back the Scientists from abroad and to provide them the facilities for research besides giving them the positions that they are entitled to as the creators of scientific thought. The recent example of Dr. Jayant Vishnu Narlikar who at an age of 25, has been able to create a new theory on gravitation in England through the assistance of the British scientist Prof. Hoyle. Our Education Minister has immediately recognised his worth and has offered him a chair in Mathematics. But how many of such young Scientists are still unrecognised in our country ? Experts do say that if Dr. Narlikar had not been in England, his genius would have been lost. This is a reflection on the facilities for research in our own Country. Many of our Scientists who have dedicated themselves to the study of Science and have made remarkable contributions in their field of study, have yet to be properly recognised ; have yet to be provided with facilties to do further research ; and have yet to give best of their intellectual output in the service of Science and the country. The two agencies mainly responsible for providing facilities and impetus to scientific research in India are the Council of Scientific and Industrial Research and the University Grants Commission. C. S. I. R. has brought a chain of 30 laboratories into existence. U.G.C. has also been providing laboratory and other facilities for research in Universities.

4.2:1. *Scientific Research in Fourth Five Year Plan:*

During the last three Five Year Plans, adequate financial provision has been made for promotion of scientific knowledge and research. The impetus had come from our late Prime Minister, Jawaharlal Nehru. C.S.I.R. scientists have drawn the plans for scientific research in the Fourth Five Year Plan. According to them an average of 1 per cent of the national income should be invested in Scientific and Tachnological research in India. This would mean that an investment of Rs. 1.129 crores would embrace a significant advancement in scientific research activities of the Central and the State Governments, Defence, Universities and the organised sector of industry. This investment of 1% of national income has been shown as "modest" as compared to what countries like China were spending on Scientific and Technological research. To maintain even the existing rate of growth for research, the country would require over 889 crores of rupees during the Fourth Five Year Plan which works out on an average of 0.8 per cent of the national income.

Let us have a comparison of the investment made on scientific research in India with other countries. The figures of 1961-62 are as under:

Country	*Investment of National* Income
India	0.32%
Sweden	1.7%
U.K.	2.7%
U.S.A.	2.9%
U.S.S.R.	3.00%

5. *Scientific Literature*

As a Librarian, my job here is not to speak about the laboratory facilities, material benefits, academic status, professional recognition, and other benefits that a scientist should get in our country. Is it not a refelection on our Government

that majority of the Scientists emigrated to the United States from Asia, are from India ? Is it not a fact that a scientist is more concerned with the existing and the latest scientific knowledge in order to improve the theories and the application of such theories for the service of man ? It has been stated by Prof. Bernal that it is not very difficult to invent a new idea by a scientist in the present century, but it is impossible to find out whether the same idea had been given out by some one, at some time, at some place and in some form of literature. This is a problem with which a scientist is faced today and which falls to the share of the librarian. The nascent thought in these days is embodied quite often in articles appearing in periodicals. For a scientist, learned periodicals are essential tools. Nearly 1,00,000 learned periodicals form the media of nascent thought in the World today. If each periodical is to be taken as a monthly then there are about 12,000,000 issues of learned periodicals appearing in the world in a year today. Let us estimate the literature output contained in the issues of the periodicals. If on an average an issue of a periodical contains 10 articles, the total number of articles appearing in the periodicals in a year, will come to 1,20,000. Then there is the barrier of language. Periodicals appear in about 80 languages in the world. But most of them are published in a few important languages. It is a fact that a research worker in India may be familiar with the scientific knowledge about his field of research only in English language, since his education at the higher level had been imparted through the medium of English. But what about the literature produced in Russian, German, French, Italian, Spanish and other languages ? Even in the English language a research worker is not provided with the development of his ideas in a particular field as recorded in periodical literature. How can Government or any other agencies overcome the lacuna in scientific research ?

6. *Indexing of Literature :*

Indexing of literature has been a boon to scientists for decades. But indexing of micro-thought had been easy for

there were limited number of publications published from various places. The terrific growth of periodical literarure and scientific research in advanced countries have made it difficult for any one to index micro-literautre. Some of the scientific organizations have solved this problem to some extent by issuing abstracts of articles in periodicals. There has been, therefore, a growth of abstracting periodicals in various sciences. These abstracting periodicals are a must for a scientist. But even then the nascent thought does not get indexed completely even with the literature that is periodically available in a country. It is for this purpose that Documentation has taken its shape.

7. *Emergence of Documentation :*

Documentation has been causing certain complications in the library field. Some regarded it as a synonymous term for bibliography-building. But a large number of persons regard it as a specialised indexing service to a specialist reader through intensive reference service including the abstracting service, the translation service and the photo-reproduction service of documents. Dr. Ranganathan has defined documentation as :

1. Promotion and practice of bringing into use of nascent micro-thought by a specialist ;
2. Pin-pointed ;
3. Exhaustive ;
4. Expedicious service of nascent micro thought to specialists ; and
5. Inspite of the continuous ever increasing cascade of nascent micro thought on an ever multiplying thought of specialised subject ; communicated through several thousand periodicals.

8. *Approach of Documentation :*

The responsibility for documentation has fallen to the share of the library profession. The profession has brought into existence documentalists and information officers. There are sharp tools which are employed for documentation in spite

of the lethargy of the library profession. The library profession has been prepared to meet this new challenge for the scientific information retrieval. But some of the unscientific persons in the library profession have taken it not as a province that belongs to the library profession but a province belonging to the subject specialists. These persons, out of sheer ignorance, have advocated that a normal indexing of literature by mere alphabets would be quite sufficient to give the desired result. Having no opporutinity to work on scientific basis and to sharpen the tools of service, some of them feel that technical skill is not necessary in documentation. The random arrangement of entries without any assistance of classification are some of the ideas which dominate their mind. It is unfortunate that some of these professional people do not visualise that in a mass of literature, a scientist is concerned with an iota of thought among the hundreds and thousands of articles ; and it is not the aplhabetical arrangement that is going to retrieve that information. Even an ordinary classifiation scheme fails to classify such type of literature. So the library profession had to devise scientific techniques to meet this situation.

9.1. *Facets of Documentation :*

Documentation is impossible unless it is backed by every facet of library activity—from document selection through acquisition, accessioning, classification, cataloguing circularion work, reference service, and maintenance work to every detail of library management—developed to a higher pitch of efficiency. The following five facets of documentation have been recognised :

1. Documentation work ;
2. Documentation service ;
3. Abstracting work ;
4. Documentation reproduction service ; and
5. Translation service.

9.2. *Documentation Lists :*

It has been enumerated by me separately that there are various patterns of documentation lists. It has also been accepted that the use of depth classification and class index entries de-

rived by Chain procedure are necessary in preparing a classified documentation list. Depth classification is a new term given to classification for micro-documents. Dr. Ranganathan was the first person to give this idea through a series of articles published in the *Abgila*. It has, however, been accepted that for documentation, analytico-synthetic classification would be necessary. Any other classification scheme that does not accept the analytico-synthetic character, is not suitable for the classification of micro-documents. During the last 15 years research in classification has led to the creation of new ideas on classification so as to make it serve the purpose of documentation. It is now an accepted fact throughout the World that the bibliographical and documentation work has to depend on a classification scheme which has got a *faceted* pattern. Prior to this idea, attempts were made to transform a rigid scheme of classification into an analytico-synthetic character. The documentation work of the Ministry of Labour and Employment; Government of India and some other ministries and a number of institutions should be taken as models. The work of Insdoc and its *Insdoc list* is an example of centralised documentation work in Natural Sciences.

9.3. *University Library and Research :*

An University is an institution for higher education and research. A library is the heart of the University since no academic and research work is possible without the assistance of a dynamic and well organised University Library. In other words, it is a focal point of study and research. Mere laboratories can not promote research in fundamental and experimental sciences. To do a piece of research, a scholar has also to find out whether some one else has already treaded that path and with what results. Besides that, what are the relevant ideas on a topic as recorded in some form of literature. Thus he has to depend on a serviceable library just at hand containing all possible materials for investigating the particular field of knowledge, in which he is interested. The University Grants Committee of Great Britain has stated :

"The fullest provision for library maintenance is the primary and most vital need in the equipment of a university. An adequate library is not only the basis of all teaching and study, it is the essential condition of research, without which no addition can be made to the sum of human knowledge".

9.4. *Research Output in Universities :*

The research output in Universities in India has increased during the last decade or so. This has been largely due to the increase in the grants, book-stock and periodicals in the University Libraries. The University Grants Commission which came into existence in 1954, appointed a Library Committee in 1957 with Dr. Ranganathan as Chairman to advise U.G.C. on improving the library service in Universities and Colleges. As a result of the recommendations of this committee, the University libraries in India have turned a new leaf. The total stock has increased within the last decade or so by 75% ; the number of current periodicals by 100% ; and the loan figures by 200%. But there has not been a proportionate increase in the research output in Universities. Only a few Universities have asked for documentation service. It goes to the credit of U.G.C. that the grades of teachers have been revised under the Third Five Year Plan. But with the increase in the grades,there should be increase in the research output by the teachers of a University. The grades of the library staff have also been brought on par with the academic staff, thanks to the U.G.C. ; but very few University Libraries have initiated specialised services to promote research activity in their Universities. Perhaps if it is made obligatory on the part of a Professor, Reader or a Lecturer to publish a research paper within a specific period, there would be a greater demand on recorded knowledge available in libraries. The libraries will then have to initiate documentation in several fields so as to feed the research scholars in their fields of search pin-pointedly, exhaustively and expeditiously with the nascent-thought which is, in short the essence of documentation.

FACTORIAL APPROACH TO PERSONALITY STUDY

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The diversity as well as the unitary nature of man has been of incessant interest to the philosopher and scientist alike. The scientific testing of personality has had a chequered career in the fields of experimental psychology and psychopathology. The chief difficulty was the confusion of the metaphysical speculations about the "ego" or "I" with the psychological traits of an individual's personality (Cattell, 1946 ; and Jalota, 1950). Even the attempts to understand human personality have marked the growth of psychology as a science and its further development from a qualitative to a quantitative science.

There are various theories, at present, to describe human personality, of which some are spurious and some scientific. Some psychologists have stressed the subjective organisation, some have emphasised the relatively consistent, objective, observable behaviour, some have laid emphasis on the cultural influence, and some have given importance to the innate biological assets in describing personality. Similarly, there have been various attempts at classifications and descriptions of personality according to types and other attributes. But the attempt to assess personality quantitatively is of recent origin. Still it is argued that measurement, the necessary basis of science, is impossible in mental life. Perhaps the wish that human mind should be untouched by science is the father to this thought, but the rapid advancement of science has falsified this philosophic conception.

Psychologists having accepted the challenge as it were, have made some bold attempts to quantify personality. They

have described the personality in terms of traits and the problem of personality testing thus has been reduced to the problem of discovering and the measuring of definite personality qualities or traits (Jalota, 1950). This shift from "type" to "trait" conception, as Stagner (1937) points out, has marked the growth of psychology as a science. By the statistical device of factor analysis, some fundamental unitary traits have been isolated from the matrix of mental life. Such a factor analytic study has also been employed to measure personality along the various dimensions.

Ever since the existance of man, human personality is described in terms of traits or qualities. Many of them are synonyms ; many overlap to various degrees ; while still others express the very opposite. But to use them all in describing personality is poor economy. By means of factor analysis, it has been possible to delineate from them a few basic dimensions along which personality could be quantified. The technique of factor analysis has been used intensively by Spearman, Thurstone, Kelly Allport, Anastasi, Thomson, Guilford ,Burt, Eysenck, and Cattell. Earlier factor analysts like Spearman, Thurstone, Kelly, etc., concentrated mainly on the problems of intelligence testing ; later on the pictorial technique was applied for the quantitative description of the non-cognitive areas of personality. Guilford feels that factors are fundamental dimensions of mind. On the other hand, Anastasi, Allport and Thomson consider factors as statistical artifact having no reality of any kind. Burt considers factors as principles of classification which Eysenck corroborates. Cattel considers factors as dimensions of personality just like physical dimension, along which personality could be quantified. The attempt made by Cattell (1957) is one of the latest, based on sound theoretical consideration. He has tried, therein, to integrate the numerous theories attempting to explain personality. On the basis of voluminous research and massive data from the triple media of behaviour ratings (L data) objective tests (T data), and questionnaires (Q data), Cattell (1946

Chap. 9-11) has distinguished fifteen temperamental or dynamic bipolar factors (or source traits) and one cognitive factor. His Sixteen Personality Factor Questionnaire, the fruit of such a vast investigations through the factorial approach has been standardised on a representative population in terms of these bipolar dimensions, factors or source traits. The author has also recently shandardised his 16 P. F. Test (in Hindi) on Indian conditions following the same approach (Kapoor, 1963). The present paper concerns with Cattells' factors of personality. It would, therefore, be in the fitness of things to examine, in a bird's eye view, the system of *constructs* as proposed by Cattell and to compare them with that of other personality psychologists.

The application of factor analysis in the area of personality research and the theories or sets of variables that it has produced, has been widely discussed by Guilford (1936, 1954, 1959), Stephenson (1952) and Thurston (1948). However, the most important of such contributions, judged by the extensity of application, are the schemes of Eysenck and Cattell. Cattell utilizes factor analysis as a subsidiary tool to enlighten a variety of problems all of which have been ordered within a systematic framework. The principal difference between Cattell and Eysenck in their use of factor analysis to personality study, derives from the fact that Eysenck typically employs the method of criterian analysis (1950, 1953) while Cattell employs the more conventional method of "simple structure" (Hall & Lindzey ; p. 394). It is also true that Eysenck (1952) customarily extracts only two or three factors in his studies whereas Cattell (1957) extracts a much larger number. Eysenck (1953) has constructed tests to measue particularly the dimensions of extaversion and neuroticism, and his application of factor analysis to see the effect of drug has, of course, been noteworthy. His findings (1960) indicate that for statistical and functional purposes the drugs can be assumed to act along a dimension of effect and may be treated as variations of the same things as far as *molar behavioural changes* are concerned. Cattell (1957), however, has surveyed all the objective tests more extensively to confirm his findings on behaviour rating and questionnaire data.

The system of constructs proposed by Cattell is among the most complex of any of the theories of personality (Hall and Lindzey, p. 395). Cattell considers that the detailed task of defining personality must await a full illumination of the concepts that a theorist plans to employ in his study of behaviour. Thus, he deliberately provides only a very general definition :

> *Personality is that which permits a prediction of what a person will do in a given situation,* The goal of psychological research in personality is thus to establish laws about what different people will do in all kinds of social and general environmental situations............ Personality is...........concerned with all the behaviour of the individual, both overt and under the skin (1950, pp. 2-3).

Cattell's conception of personality will have a complete picture only when one has examined the meaning of trait and other concepts employed by him to outline the nature of personality.

Amongst all the concepts employed by Cattell, the trait is by far the most important. He is considered as one of the leaders in "Trait Psychology". The earliest trait concepts were genuinely mask approaches to personality because they were used to describe *surface* characteristics of the individual. A substance approach to the treatment of traits has been stressed first by Allport (1937, pp. 324-325). Allport and Odbert (1936) found 17,953 terms which were used to describe characteristics of people. Allport has urged a search for the determiners of behaviour and has distinguished two basic kinds of traits—the *genotypical* zand *phenotypical.* He borrowed these terms from Lewin (1935, 1951) who has shown the general problem of appearance versus underlying cause to be of considerable importance in the investigation of personality. Descriptions in terms of here-and-now attributes are *phenotypical ;* while the explanatory accounts, seeking underlying motives and stresses, are *genotypical.* For Allport, some traits are more important than others. The *genotypical* traits are more inclusive and relatively independent of specific situations. The *phenotypical*

traits are less consistent and more limited in scope. They are much more numerous and are the mask features of personality.

Cattell, in his attempt to classify traits, proposed "trait-elements" as representative of the smallest behaviour fragments or narrow traits (Cattell, 1946). These include an enormous number of characteristics. As cattell himself points out",...... the dictionary gives a trait of 'manual dexterity' ; but this could be split into 'dexterity in shuffling cards,"—'dexterity with a screwdriver' and so on" (1950, p. 21). While taking account of the greater generality of some traits, be introduced the category of "*surface traits*". These are like Allports phenotypical traits. They may be very broad or narrow, according to their dependence upon specific situations, but they are always more general than *trait-elements*. In Cattell's words, "A *surface trait* is in any case simply a collection of *trait-elements*, of greater or lesser width of representation, which obviously 'go together' in many different individuals and circumstances" (1950, p. 21). *Surface traits* and *trait-elements* are really mask-aspects of personality description in Cattell's system. Therefore, recognition is given to the determining nature of certain individual characteristics by means of the category "*source traits*" (1957). His *source-traits* are really the determiners of the surface behaviour of the individual and represent the stable and consistent aspects of personality. In this sense they are somewhat analogous (but not equivalent) to Allport's genotypical traits.

In addition to being concerned with the inclusiveness of a trait, Cattell is also interested in finding out whether certain traints are possessed by large groups of people or by a particular individual as a unique characteristic of that person. "*Common-traits*" are possessed by all or large groups of people, depending upon common hereditary possibilities and similar cultural patterns. A "*unique-trait*", however, is peculiar to an individual —no other person possesses that particular pattern (1950, p. 32-33). In addition to these formal ways of classifying traits, Cattell has found it convenient to indentify traits in accordance with three rough modes, They are "*ability-traits*," "*tempera-*

ment-traits", and "*dynamic traits*" (1950, p. 35-36). Ability traits are defined as, "how well the person makes his way to the accepted goals". Dynamic traits or interests include basic drives (called "erg") and acquired interests such as *attitudes, sentiments, complexes, superego* and *ego formations* (called "metanergs"). *Temperament-traits* represent the remainder of characteristics which are not influenced by task complexity or incentives. They appear to be largely constitutional, including high-strungness, speed, energy, and emotional reactivity. Further, the traits that result from the operation of environmental conditions are called "*environmental-mold traits* ;" those that reflect hereditary factors are called "*constitutional-traits*".

Cattell derives *surface-traits* empircally by means of "*clusters*". They are derived through ordinary correlational methods. Those that seemed to co-vary are considered to represent a single *surface-trait.* He also shows that the large number of *surface-traits* could be further reduced to about twenty "*sectors*" by bringing together those *surface-traits* that shared something in common. The surface traits are presented with an identifying index-number, a brief description title and a list of the items or variables that comprise the *cluster* making up the traits.

He, further derives *source-traits* empirically through three major approaches to personality measurement : the life record (L data), the self-rating (Q data), and the objective test (T data). His method of identifying and classifying *source-traits* is entirely statistical and logical. His system makes use of correlational techniques (R. P. and Q) for relating the behaviour of different people in a variety of test situations (Cattell, 1956, p. 71). In this way it is possible to study, interindividual relationships in different test situations, interindividual relationship on the same test situation, and interest relationships on the same individuals. By means of factor analysis of these kinds of intercorrelations, various traits may be isolated. By this method, Cattell hopes to extract the variables that underlie or

contribute most of the variability to the large number of initial measures. He refers to these variables by means of the index numbers which he provides. The essence of the definition for each trait is a list of the items or measures that are most loaded with this factor, that is, the items to which this factor contributed most. Thus, one of the goals of this factorial approach is to eventually establish the minimum number of 'factors' which will account for all the variability in personality. As a result of his investigations Cattell has been able to develop a number of objective personality tests for measuring the principal *source-traits* or *factors* (Cattell 1954, ; Cattell and Beloff, 1953 ; Cattell and Stice, 1957, 1962).

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THE EYE THAT SEES HEAT

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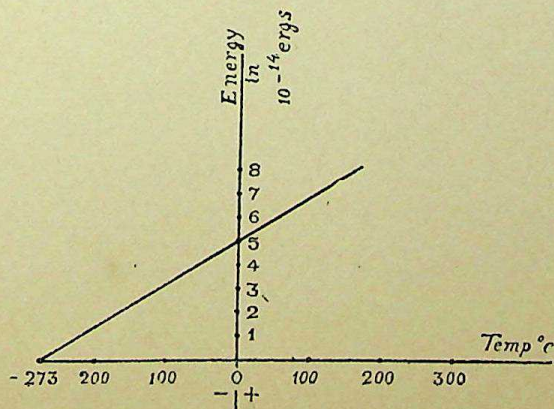
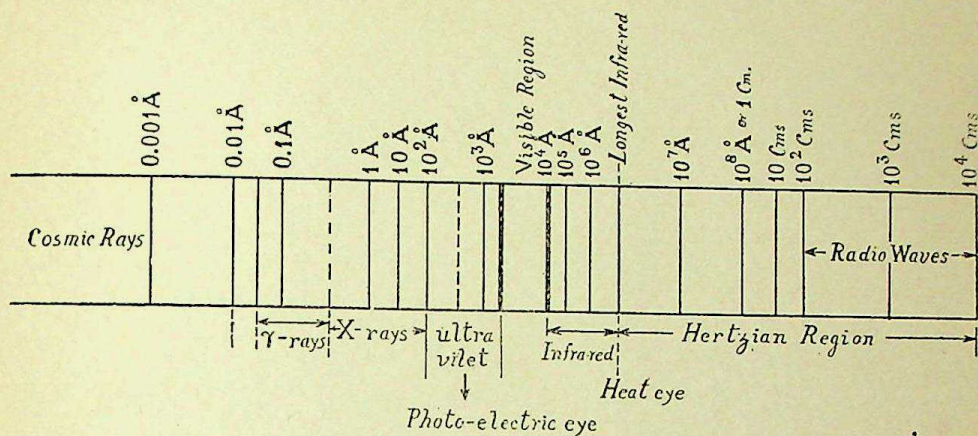
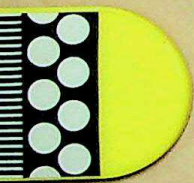
Infra-red Radiation. Ordinary Heat Waves :

In the modern age some discoveries and inventions have been epoch making. Photo-electric effect is one of them. The phenomenon has resulted in the construction of a photo-electric cell (Eye), which is a device for converting light energy into electrical energy. Photo-electric element is a very significant instrument and finds immense application in Talking picture, Television, Exposure-meter and Burglars alarm and under numerous aspects of industrial electronics.

If we look at the Radiation Spectrum (Figure 1), one finds, that the phenomenon occupies a place in a region towards the left of the visible region. Exactly on the right side, the infra-red has given rise to the discovery of "Heat Eye". The properties of these ordinary heat waves were discovered by W. Herschel (1850), an English Astronomer. These infra-red rays, which activate such a device, "Heat Eye" are members of the great family of electromagnetic radiation, such as Light rays, X-rays, Radio and Radar waves, which have different effects, because of their different wave-lengths. Since, virtually everything gives off some heat, you can pick up the tell-tale radiation of any object at long ranges.

All matter with a temperature above absolute zero (-273°C) emits infra-red. The higher the temperature, the more intense is the radiation. It is a form of energy too, and thus heats up any object, which absorbs it. The wave-lengths of such a radiation lie in the range 7μ to 300μ ($\mu = 10^{-4}$ cms).

Since all vibrations cease at absolute zero and so, this confirms the view, that the thermal energy of the atoms and molecules reduces to zero. The same is roughly indicated vide figure 2.

The various uses and applications to which Infra-red radiations have been put and possibly can be put are as follows :

(A) Military, Industry and Transport.

Such as :

(i) Missile having in its nose "feeler", which contains Lead sulphide crystal, can get to a target, rocket or even a guided missile. This feeler can detect a burning cigarette at least at 100 yards and from jet exhaust upto 4 miles.

(ii) Infra-red receivers are supplementing Radar to scan the sky. Unlike radar they give off no special radiation themselves.

(iii) Heat pictures (photographs) can reveal the city's big power-plants, that stand out like search light. The brightness of avenues and streets indicates the density of heat emitting traffic and so the population density also. Similarly, heat pictures can be used to locate airports and military stations during blackouts.

(iv) "Heat Eyes" are used to examine "Hot Boxes" on railway tracks and carriages. When the wheels of a carriage are moving at such speeds as 60 miles/hour or more, due to the lubrication failure, serious accidents can occur. Such devices can detect the overheated axle and thus avoid serious demage and loss of life and property.

(v) Motor tyre companies use heat detectors to detect and compare the effiectveness of different designs and materials.

(vi) The invisible fences of "Infra-red rays", if intercepted, cause alarm and thus can be used effectively for "Watch and Ward Purposes", for the factories, airports and naval bases during peace as well as War.

(B) Medicine :

Diagnosis in some cases can be done with great ease, e.g. the site of a malignant tumour can be located, because of its temperature, by such heat measuring devices.

(C) Meteorology :

Meteorology represents another promising example of "Heat-Eye" utilization. Heat from clouds etc. renders a great help in Weather forecasting.

(D) Infra-red detectors are thus allies of space age.

(E) Infra-red spectrometers are not only used for molecular structure determination, but are of immense help for Police and Investigation Department in the case of theft, murder and poisoning. It is expected, that in times to come the use of "Heat Eye" will grow in appreciation as an excellent technical method in various fields.

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METALS MADE TO ORDER

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As long ago as the beginning of the Bronze Age of antiquity, man discovered that by mixing molten metals and allowing them to harden, a product was obtained whose properties differed in many respects from those of parent metals. While these mixtures may vary greatly as to their components and properties and somewhat even as to the relation of components in them, they are generally known as alloys.

Chemically pure metals are associated with limited useful properties. Thus, copper in pure form is soft, ductile and maleable and consequently its use is very limited, but when alloyed with beryllium it can be used in the form of springs, high speed tools and electrical contact points. Likewise, iron is also soft but when this is alloyed with Nickel, Manganese, Tungsten, Vanadium or Chromium it becomes hard and this hard alloy is ultimately known as steel. Steel infact is defined as a maleable alloy of iron and iron carbide.

Often alloys have properties which are superior to those of any of the constituent metals, such is the case with the wide varieties of alloys of Magnesium and Aluminium which are used in modern construction where a light strong metal is needed. Notable among the alloys of magnesium are those known collectively as the Dow metals. These contain 88 to 98 per cent of Mg with the remaining percentage of Al, save from small fractions of a percent of Mn and of Zn which also vary from one alloy to another. The manganese greatly increase the resistance of Mg against water, especially water containing dissolved substances. Besides being light these alloys posses a high tensile strength and may be drawn, forged rolled and machined. During World War II, the major portion of these alloys was diverted to the production of military airplanes, but with the conclusion of the war they have found an increasing

use in the construction of the machines. The surfaces of articles made of these light metal alloys are protected from the action of the weather, water and other agents by treating objects made of them either electrolytically in certain oxidising solutions or under pressure with sodium hydroxide. In both the cases, a thick and adherent protection film is formed.

Another important alloy is Brass which is a Cu-Zn alloy. It has got an approximate composition of 70% Cu and 30% Zn or 60% Cu and 40% Zn. The best composition of strength and ductility is obtained with 30% Zn. But these brasses do not work well at higher temperatures and are used where large amount of cold work is desired. An alloy containing 23% of Zn is bright yellow like gold and is used as a substitute for gold leaf or gold powder. Alloys containing more than 40% of Zn are useful for drawing wires at high temperature.

Titanium has got the characteristic of combining strength with lightness and has outstanding corrosion resistance. A large number of applications in which titanium can be used successfully have been found in present day aircraft-compressor blades, discs and engine cowlings etc., but major replacements of high temperature steels and nickel alloys by Ti have been restricted by the fact that the strength of Ti base materials fall off quickly as the temperature is increased, and the limit of usefulness of titanium alloys lies somewhere in the region of 500°C. Looking towards the future it seems likely that metals will be called upon to fulfil functions never before envisaged. In nuclear energy applications, for instance, titanium may find uses which depend on the fact that under neutron irradiation it forms no isotopes having undesirably long half-lives. It is probable, therefore, that we have not come to the end of the new types of titanium alloys for which demands may arise.

Another important class of alloys are ferrous-alloys which invariably contain iron and carbon, and also one or two of the following metals : Mn, Ni, Cr, W, Si, Cu, V, and Mo etc.

When the percentage of carbon in the alloy is below 0.1, the alloy is termed the iron alloy and if it is above that it is called alloy steel. Steel is the name applied to iron which contains from 0.05 to 2 per cent of carbon and is capable of being hardened by quenching in oil or water. The properties of a given sample of steel depend not only upon its carbon content but also on its heat treatment or tempering.

Knowledge of the ferrous alloys has been greatly expanded by investigations conducted during the present century. The special alloy steels are of great importance in the modern world and in many instances have displaced simple steels. The most important among steel alloys is chromium alloys. Chromium makes the steel extremely hard. The steel is used in crushing machinary, valves of soft deposit vaults, sasafes, files, chisels, drills etc. When the amount of chromium is considerable, it makes the steel corrosion proof. The corrosion resistance is increased by the addition of nickel to the chromium steel. These steels are called Stainless Steels, ever silver, etc. A typical composition of such steels is 18% Cr, 8% Ni, and 74% steel. These steels are now employed in hydraulic engineering, food industry, domestic cutlery, and dishes etc.

The addition of Tungsten in stainless steels and heat-resisting steels confers an increase at elated temperatures as well as slight increase in overall corrosion resistance. The following types of steels may be mentioned in this connection :

(1) Steel containing 7.3% Cr, 0.45% C, 3.5% Al, and 1% W has been suggested as a valve material for internal combustion engines.

(2) Steel containing 5% Cr, 0.25% C and 1% W finds wide use as distilling tubes for oil refineries.

(3) Steel containing 12% Cr, 2% Ni, 0.12% C, and 0.3% W is used for bolts and turbine materials.

(4) Steel containing 14% Cr, 14% Ni, 0.4% C, 0.3 to 0.8% Si, and 1.75 to 3% W is most widely used for exhaust valves in United States aircraft engines.

W-Mo alloys are prepared by thoroughly mixing the metal powders, pressing into bars and sintering. Because of their higher resistance they have been used as hooks in high wattage lamps, supports, springs in discharge tubes heaters in radio tubes and resistance wires for high temperature electric furnaces. The usual composition of such W-Mo alloys are 90-10, 80-20 and 72.5-27.5 etc. They have also been used as substitutes for platinum in dentistry.

Elkonite, an alloy of Cu and W is employed as lining for bearings, electrodes for spot welding, as contacts for circuit breakers and switches. Clotaloy, another new type of Cu-W alloy is used in radium therapy providing adequate protection from the penetrating alpha rays.

The use of Indium-precious metal alloys is rapidly gaining popularity for jewelry and in dental work. When added in amounts varying from 0.5 to 5% to alloys of Au, Ag, Pd and Cu, there is marked improvement in colour, permanence and melting range. Indium added to Wood's or Lipowitz metal (about 18%) gives an alloy with a melting point of 46.5°C. This low temperature makes possible to apply such an alloy without discomfort to the skin of the body and its use has been suggested for surgical casts in place of plaster of Paris.

Among the notable alloys of rare-earths, Cerium alloys come first. By far the most interesting alloy of cerium is the one called "misch metal", mixed metal commercial cerium etc. It is essentially a mixture of Ce, La, Nd, Pr, but as usually prepared, it contains from 1-5 per cent iron and very small amounts of other elements. This is found to be a powerful reducing agent. A small amount of the metal in powder form finds use as component of flash light powders where it produces more intense action. About 1920, it was tried experimently as a scavanger for cast iron. The use of Ce alloys for the purification of the gas in the manufacture of neon lamps has also shown promise.

Now we see how these metals which are made to order have played an important role in man's civilization. It would have been impossible to develop processes such as the high pressure synthesis of ammonia, nitric acid etc, in the absence of V and Cr steels. Our mechanical advance would come to a stand still if the special alloy steels are not made available to our engineers. Every minute of our life is associated with some use of an alloy and day by day the applications of alloys are increasing by leaps and bounds. The metallurgy and production of alloys require a thorough knowledge of chemistry and physics and it is necessary for a modern chemist to know the recent advances in the subject since he is concerned with them both in the production and the application stages.

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'चन्द्रगुप्त' नाटक में पात्र विडम्बना

विद्या गुप्त
महिला महाविद्यालय

हिन्दी नाट्य-साहित्य में स्वर्गीय जयशंकर प्रसाद जी का नाम अपना विशिष्ट महत्त्व रखता है। उनकी सजग प्रतिभा ने इतिहास के खंडहरों से चुन-चुन कर जिन महान पात्रों की सृष्टि की है वे उनकी कल्पना और अनुभूति की संवेदनात्मक तरलता के स्पर्श से सजीव हो उठे हैं। अतीत के वे पात्र वर्तमान में श्वास लेते हुए भी अतीत के गौरव को, उसकी जय-पराजय को इस प्रकार मुखरित करते हैं कि उनमें काल-दोष नहीं आने पाता। **'चन्द्रगुप्त'** नाटक के अनेक उद्गार सामयिक परिस्थितियों के द्योतक हैं; जैसे—"धर्म की ओट में मूर्ख जनता नचाई जा रही है"। तथा—"मालव और मागध को भूलकर जब तुम आर्य्यावर्त्त का नाम लोगे तभी वह मिलेगा"। अलका के राजनीतिक विचार आज की स्वाधीन नारी के हृदयोद्गार हैं। **'ध्रुवस्वामिनी'** की समस्या तो आधुनिक नारी की एक अत्यन्त विवाद-ग्रस्त समस्या रही है।

कथानक के निर्माण में जिन ऐतिहासिक एवं कल्पित पात्रों का प्रसाद जी ने निर्माण किया है वे अपने चारित्रिक सौन्दर्य की सजीवता से अपने पाठकों और आलोचकों को इतना मुग्ध कर लेते हैं कि अनेक स्थलों पर उनकी चारित्रिक असंगतियाँ आलोचक की दृष्टि से ओझल हो जाती हैं। डॉक्टर नगेन्द्र के मतानुसार प्रसाद जी के पात्र निम्न वर्गों में बाँटे जा सकते हैं—

पुरुष पात्र—(i) जीवन के तत्त्वों को सुलझाने वाले आचार्य एवं दार्शनिक तत्त्ववेत्ता।
(ii) जीवन संग्राम में प्रवृत्त होकर जूझने वाले कर्मठ सैनिक।
(iii) राजनीति के दाँव पेंचो को सिखाने वाले कूटनीतिज्ञ।

स्त्री पात्र—(i) राजनीति की आग से खेलने वाली राज महिषियाँ।
(ii) जीवन-युद्ध में स्वाभिमान का सम्बल लेकर कूदने वाली राज पुत्रियाँ।
(iii) जीवन के भँवर में पड़ी मध्यवर्गीय दुर्बल नारियाँ।
(iv) अपने निस्पृह बलिदान से नाटक के जीवन में एक करुण गन्ध छोड़ जाने वाली फूल सी सुकुमारियाँ।

इस वर्ग-विभाजन से हम सहमत हैं, किन्तु कभी-कभी इन पात्रों के कार्य-व्यवहार और वार्तालाप में ऐसी असंगतियाँ घटित होती हैं कि पात्रों का चरित्र-सौष्ठव हास्य जनक हो उठता है। उदाहरणतः 'चन्द्रगुप्त' नाटक का प्रथम दृश्य तक्षशिला के गुरुकुल के दृश्य को प्रस्तुत करता है जहाँ चाणक्य और सिंहरण जो नाटक के अत्यन्त महत्त्व पूर्ण पात्र हैं, वार्तालाप करते दिखाई पड़ते हैं :

चाणक्य—सौम्य, कुलपति ने मुझे गृहस्थ जीवन में प्रवेश करने की आज्ञा दे दी है।

केवल तुम्हीं लोगों को अर्थशास्त्र पढ़ाने के लिए ठहरा था, क्योंकि इस वर्ष के भावी स्नातकों को अर्थशास्त्र पढ़ा कर मुझ अकिंचन को गुरुदक्षिणा चुका देनी थी।

सिंहरण—आर्य; मालवों को अर्थ शास्त्र की उतनी आवश्यकता नहीं जितनी अस्त्र शास्त्र की। इसीलिए मैं पाठ में पिछड़ा रहा, क्षमा प्रार्थी हूँ।

सिंहरण की अर्थशास्त्र के प्रति विरक्ति और उपेक्षा गुरु के अहंकार पर मानों एक प्रहार है और वह मानों अपनी झेंप मिटाने के लिए विषयान्तर करता है—

चाणक्य—अच्छा, अब तुम मालव जाकर क्या करोगे ?

सिंहरण—अभी तो मैं मालव नहीं जाता। मुझे तक्षशिला की राजनीति पर दृष्टि रखने की आज्ञा मिली है।

आगे चलकर चाणक्य सिंहरण से कहता है—"मुझे प्रसन्नता होती है कि तुम्हारा अर्थ-शास्त्र पढ़ना सफल होगा"।

अर्थ-शास्त्र में पिछड़े हुए छात्र के प्रति, जो स्पष्ट शब्दों में मालवों के लिए अर्थशास्त्र को अनावश्यक समझता है, यह प्रशंसापूर्ण उक्ति प्रसंग के गांभीर्य को नष्ट कर देती है। आर्यावर्त्त का कूटनीतिज्ञ चाणक्य एक हतबुद्धि आचार्य मात्र सिद्ध होता है जो किसी न किसी प्रकार अपने गुरुत्व को शिष्य पर लाद कर अपने अहं को तुष्ट करने का अभिलाषी है।

कथा की गति में क्षिप्रता है, अनेक संघर्षों और षडयन्त्रों का सफलतापूर्वक सामना करता हुआ चाणक्य नन्दराज्य के विध्वंस की अन्तिम योजना बनाता है—नंद के मनं में भ्रम उत्पन्न कर, राक्षस और सुवासिनी के विवाह में बाधा डलवा कर, उन्हें बन्दी बनवा कर। वह मालविका से प्रश्न करता है—"मालविका, तुम नर्तकी बन सकती हो" ?

मालविका—हाँ, मैं नृत्यकला जानती हूँ।

चाणक्य उसे एक पत्र और मुद्रा देकर नन्द के हाथ में देने की आज्ञा देता है। उसका आदेश है कि वह नन्द के मन में यह भ्रम उत्पन्न करे कि वह राक्षस का पत्र सुवासिनी तक समय पर नहीं पहुँचा सकी। चन्द्रगुप्त से गुप्त प्रणय रखने वाली मालविका इस असत्य भाषण के लिए प्रस्तुत हो जाती है। नन्द के क्रोध-भाजन राक्षस और सुवासिनी बनते हैं किन्तु मालविका के नृत्य-ज्ञान का कोई उपयोग नहीं होता। अतः नृत्य का प्रसंग निरर्थक और असंगत हो उठता है।

नाटक में सौन्दर्य-द्रष्टा भावुक कवि की दृष्टि ने सौन्दर्य की मार्मिक झाँकियाँ प्रस्तुत की हैं। मांसल-सौन्दर्य की स्थूलता से परे जो भावना का अतीन्द्रिय सौन्दर्य बोध है, कलाकार की दृष्टि उसी पर केन्द्रित है। रूप-रंग का बाह्य-विधान जो सदियों तक पाठकों की रुचि को दूषित करने का दोषी था, प्रसाद जी में किंचित् मात्र भी नहीं है। ऐसा प्रतीत होता है कि इस सौन्दर्य-प्राण कवि को असुन्दर का आभास भी असह्य है। यही कारण है कि '**मुद्राराक्षस**' का नीति-निष्णात, स्वामिभक्त मन्त्री राक्षस 'चन्द्रगुप्त' में आकर प्रसाद जी की सहृदयता प्राप्त करने में असमर्थ रहा। राक्षस नाम की भयंकरता रागात्मक अनुभूतियों की गीतात्मक मूर्छना में विवादी स्वर सी खटकने लगी और स्वर्गीय अमात्य वक्रनास

के भ्रातृष्पुत्र राक्षस को हम कुसुमपुर में मदिरा-प्रमत्त, नाच-गान-रत पाते हैं। नागरिकों के अनुरोध पर सुवासिनी अभिनय पूर्ण गान के लिए प्रस्तुत होती है, किन्तु उसका आग्रह है कि राक्षस कच का अभिनय करे। इस पर एक नागरिक परिहासपूर्वक कहता है—"राक्षस सचमुच राक्षस होगा यदि इसमें आनाकानी करे"।

नन्दवंश के पतन की योजनाओं में राक्षस को कुछ विलम्ब तक विपाशा तट पर अटकाए रखने की चाणक्य आवश्यकता समझता है। राक्षस और नन्द के मध्य अविश्वास की गहरी खाई खोद कर राक्षस को अनुकूल बनाने की योजना में चाणक्य प्रेरित एक दल राक्षस को नन्द की ओर से बन्दी बनाने के लिए जाता है और दूसरा दल आकर पहले दल को बन्दी बनाता है। राक्षस चकित भाव से दूसरे दल से पूछता है—"तुम सब कौन हो"? उत्तर में 'राक्षस के शरीर रक्षक' सुनकर वह घोरतर आश्चर्य में निमग्न हो जाता है। अनायास उसके मुँह से निकलता है—"मेरे"?

नवागत सैनिकों का उत्तर शील और मर्यादा के विपरीत है—"हाँ अमात्य! आर्य्य चाणक्य की आज्ञा है कि जब तक यवनों का उपद्रव है तब तक सबकी रक्षा होनी चाहिए, भले ही वह राक्षस क्यों न हो"?

राक्षस के प्रति प्रसाद जी की विरक्ति राक्षस को देश-द्रोही रूप में सिल्यूकस के राज मन्दिर में पहुँचा देती है जहाँ कार्नेलिया द्वारा वह तिरस्कृत और अपमानित होता है। वह उसे 'देश-द्रोही' और 'पाप की मलिन छाया' कहती है। उसका कथन है—"उसके देश ने उसका नाम कुछ समझ कर ही रक्खा है—राक्षस! मैं उससे डरती हूँ"।

प्रसाद जी का संस्कृति-प्रेम और स्वदेश के प्रति अनुराग विदेशी आक्रमणकारियों की श्रेष्ठता या वीरत्व को स्वीकार नहीं करता। सिकंन्दर की पुरु-विजय के स्पष्ट तीन कारण उन्होंने बताए हैं—

(१) पारस्परिक द्वेष और स्पर्धा की अग्नि में झुलसते हुए देश-द्रोहियों का आक्रमण कारियों से सहयोग,

(२) दैव की प्रतिकूलता जो प्राकृतिक उत्पात, घोर वर्षा के रूप में अनिष्ट का कारण बनती है,

(३) विदेशियों की युद्धनीति और पर्व्वतेश्वर का अहंकार,

सिकन्दर ने युद्ध में बन्दी पर्व्वतेश्वर से पूछा कि वह उससे कैसा व्यवहार करे? पर्व्वतेश्वर ने वीरोचित उत्तर दिया—"जैसा एक नरपति दूसरे नरपति के साथ करता है।" प्रसाद जी की दृष्टि में पर्व्वतेश्वर ने नरपति के उपयुक्त व्यवहार माँग कर भयंकर भूल की और वह प्रसाद जी की क्षमा और उदारता का अधिकारी न रह गया। अलका के शब्दों में प्रसाद जी का मत स्पष्ट है—"महाराज, यदि भूपालों का सा व्यवहार न माँग कर आप सिकन्दर से द्वन्द्व-युद्ध माँगते, तो अलका को विचार करने का अवसर मिलता।" फलतः प्रसाद जी की सहानुभूति से वंचित पर्व्वतेश्वर दम्भी, कृतघ्न कामुक और विश्वासघाती के रूप में 'चन्द्रगुप्त' नाटक में चित्रित किया गया है। अलका के रूप पर मुग्ध होकर वह सिंहरण को बन्दी करता है, अलका से प्रणय निवेदन करता है। मालवों के विरुद्ध सिकन्दर को सहायता देने

का वचन देकर देश-द्रोह करता है। मगध-विजय के अवसर पर मद्यप के समान राजोद्यान में चन्द्रगुप्त के विरुद्ध षड़यन्त्र रचने की आकांक्षा करता है। आधा मगध-राज्य न मिलने का क्षोभ मानवीय दुर्बलता मानी जा सकती है किन्तु कल्याणी के प्रति उसका व्यवहार, उससे विवाह का प्रस्ताव—"हमारे-तुम्हारे मिल जाने से मगध का पूरा राज्य हम लोगों का हो जायगा। उत्तरापथ की संकटमयी परिस्थिति से अलग रह कर यहीं शान्ति मिलेगी।" उसके शौर्य का भयानक उपहास तो है ही साथ ही उसे क्षुद्रमना-कामुक भी सिद्ध करता है। कल्याणी पर बल प्रयोग की चेष्टा पर्व्वतेश्वर के चारित्रिक पतन की पराकाष्ठा है। कल्याणी द्वारा उसका वध उसके जीवन की सबसे बड़ी विडम्बना है और इस प्रकार इतिहास-प्रसिद्ध, विदेशियों द्वारा अपने शौर्य के लिए प्रशंसित वीर-पुंगव पर्व्वतेश्वर चन्द्रगुप्त नाटक का एक अत्यंत दयनीय, तिरस्कृत पात्र रह जाता है।

स्वदेश प्रेम ने प्रसाद जी को विदेशी महत्त्वाकांक्षिओं के प्रति इतना असहिष्णु बना दिया है कि उनके वीरत्व, पौरुष और विवेक सभी संदिग्ध हो उठे हैं। सिल्यूकस को ही लें, वह कानन में एकाकिनी अलका को देख कर प्रश्न करता है—"तुम कहाँ? सुन्दरी राज कुमारी।"

अलका के दार्शनिक उत्तर की उपेक्षा कर वह पुनः कहता है—"यहाँ तो तुम अकेली हो सुन्दरी।"

संभवतः उसके प्रश्न में चतुर अलका को किसी दुरभिसन्धि की गन्ध आती है और वह कौशल पूर्वक यवन को भुलावा देती है—'"....परन्तु देखो वह सिंह आ रहा है।" जब तक सिल्यूकस निर्दिष्ट दिशा की ओर देखता है वह ऐसी विलुप्त हो जाती है कि असहाय सा सिल्यूकस मानों हाथ मलकर पछताता रह जाता है—"निकल गयी।"

क्या ऐसा व्यक्ति जो सहज ही प्रवंचित हो सके, विश्वविजय के आकांक्षी व्यक्ति का सम्मानित सेनानी हो सकता है?

जगद्विजयी कहलाने का अहंकार रखनेवाला सिकन्दर भी अपनी नीति-कुशलता का कोई सराहनीय अवसर पाठक को नहीं देता। इस सम्बन्ध में एक प्रसंग द्रष्टव्य है। फिलिप्स द्वारा कार्नेलिया को अपमानित होने से चन्द्रगुप्त बचाता है। फिलिप्स बदले की भावना से सिल्यूकस पर षड़यन्त्र में लिप्त होने का आरोप सिकन्दर के सम्मुख लगाता है। —"इनकी कन्या दांड्यायन के आश्रम पर भारतीय-दर्शन पढ़ने जाती है और भारतीय संगीत सीखती है, वहीं पर विद्रोहकारिणी अलका भी आती है और चन्द्रगुप्त के लिए यह जनरव फैलाया गया है कि वही भारत का भावी सम्राट् होगा।"

उत्तेजित सिल्यूकस फिलिप्स से रोष-पूर्वक कहता है—"रोक, अपनी अबाध गति से चलनेवाली जिह्वा रोक!"

सिकन्दर—ठहरो सिल्यूकस! तुम अपने को विचाराधीन समझो। हाँ तो चन्द्र-गुप्त! मुझे तुम से कुछ पूछना है।

चन्द्रगुप्त—क्या है?

चन्द्रगुप्त के स्वर में विनय और शील नहीं, दृप्त भाव है। सिकन्दर से उसे भय नहीं और वह सिकन्दर के मगध-विजय में सैनिक सहायता के प्रस्ताव को भी उपेक्षा पूर्वक ठुकरा देता है। यही नहीं, वह सिकन्दर की सेना को लुटेरों की सेना कहता है। क्रुद्ध सिकन्दर के अहंकार पर उसके शब्द हथौड़े की चोट सदृश हैं—"क्या यह झूठ है? लूट के लोभ से हत्या व्यवसाइयों को एकत्र करके उन्हें वीर सेना कहना रण-कला का उपहास करना है।"

सिकन्दर क्रोध से हतबुद्धि हो सिल्यूकस से, आश्चर्य पूर्वक कहता है—"सिल्यूकस !"

चन्द्रगुप्त—"सिल्यूकस नहीं, चन्द्रगुप्त से कहने की बात चन्द्रगुप्त से कहनी चाहिए।"

यवन-शौर्य और भारतीय-शौर्य की यहाँ एक तुलनात्मक झाँकी प्रस्तुत होती है; यवन और भारतीय बुद्धिबल तथा क्षमता का परिचय मिल जाता है। एकाकी चन्द्रगुप्त को जब सिकन्दर वन्दी बनाने का आदेश देता है तब वह अद्‌भुत वीरता से आक्रमणकारियों को घायल करता हुआ निकल जाता है।

विस्मित सिकन्दर मानों असहाय भाव से पुकारता है—"सिल्यूकस।"

सिल्यूकस—सम्राट्।

सिकन्दर—यह क्या ?

सिल्यूकस—आप का अविवेक ! चन्द्रगुप्त वीर युवक है। यह आचरण उसकी भावी श्री और पूर्ण मनुष्यता का द्योतक है सम्राट्। हम लोग जिस काम से आए हैं, उसे करना चाहिए। फिलिप्स को अन्तःपुर की महिलाओं के साथ वाल्हीक जाने दीजिए।

सिकन्दर (सोचकर)—अच्छा जाओ।

सम्पूर्ण प्रसंग असंगत है। वही सिल्यूकस जो कुछ क्षण पूर्व सिकन्दर के सम्मुख अपराधी प्रमाणित किया गया था सहसा ही उसका परामर्शदाता वन जाता है। फिलिप्स, ऐनिसाक्राटीज आदि मूक, उपेक्षित खड़े रहते हैं। इससे भी अधिक अविश्वसनीय और घोरतर विस्मय की बात है कि जिस फिलिप्स पर सिल्यूकस ने चरित्रहीनता का दोष लगाया था, अब उसे ही अन्तःपुर का रक्षक नियुक्त करने की सम्मति देता है।

इस प्रकार प्रसाद जी के वे पात्र जिन्हें उनकी सहृदयता प्राप्त नहीं हुई, हास्यास्पद हो उठे हैं। प्रसाद जी की यह पात्र-विडम्बना अनेक स्थलों पर सोद्देश्य है। उनकी देश भक्ति, सौन्दर्य भावना और सांस्कृतिक महत्ता के भाव ने उन्हें पात्रों के चारित्रिक उत्थान-पतन के पक्षपात-पूर्ण चित्रण के लिए प्रेरित किया है।

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पूर्वमध्ययुगीन भारतीय राजनीति सिद्धांत सम्बन्धी सामग्री का मूल्यांकन

डॉ० जयशंकर मिश्र
कुरुक्षेत्र विश्वविद्यालय

भारतवर्ष में प्राचीन काल से ही राजनीति सिद्धांत सम्बन्धी अनेकानेक ऐसे विवरण लिखे जाते रहे हैं, जो तत्कालीन समाज की प्रचलित प्रथा और व्यवहार को उद्घाटित करते हैं। इनमें स्मृतियाँ, धर्मशास्त्र, महाकाव्य, प्रबंध, अभिलेख आदि प्रमुख हैं। भारतीय लेखकों के अतिरिक्त अनेक विदेशी यात्री लेखकों ने भी इस संबन्ध में लिखा है। ग्रीक लेखक मेगस्थनीज सबसे पहला यात्री लेखक है। फाहियान और ह्वेनसांग जैसे विदेशी यात्रियों ने भी यत्र-तत्र भारतीय राजनीति सिद्धांत संबन्धी प्रचलित व्यवस्थाओं का आभास दिया है। इन विवरणों में संक्षिप्तता होते हुए भी अपनी महत्ता है। उनसे तात्कालीन समाज पर प्रकाश पड़ता है। उन्हीं विदेशी यात्रियों की भाँति अरब-यात्री अलबीरूनी का भी महत्त्व है। वह महमूद गजनवी का राज-दरबारी लेखक था। उसने १०२७-२८ ई० में भारत की यात्रा की थी तथा पंजाब के कुछ स्थानों का भ्रमण कर १०२८-२९ ई० में गजनी लौट गया था। लौटने पर उसने भारत के विभिन्न विषयों को संयोजित कर 'तहकीक मालिल् हिन्द' नामक ग्रन्थ की रचना अरबी में की। उस ग्रन्थ में उसने अन्य भारतीय विवरणों के अतिरिक्त भारतीय राजनीति सिद्धांत सम्बन्धी कुछ विवरण भी दिए हैं। तद्‌युगीन भारतीय राजनीतिक व्यवस्था और व्यवहार के निरूपण में उसकी सामग्री का महत्त्वपूर्ण योग है। निश्चय ही उसने इस संबंध में प्रकारांतर से लिखा है किंतु जो कुछ भी उसने लिखा है, उसका ऐतिहासिक महत्व है। अलबीरूनी की सामग्री अब तक उपेक्षित ही थी। यद्यपि उस सामग्री का उपयोग किए विना तत्कालीन समाज के राजनीतिक इतिहास और व्यवहार पर लिखना परिपूर्णता नहीं है।

अलबीरूनी ने भारतीय विधि और शासन-पद्धत्ति पर प्रकारांतर से लिखा है। राजा और मंत्रियों के कर्त्तव्य एवं अधिकार तथा देश के केंद्रीय और प्रांतीय शासन पर उसने कुछ नहीं लिखा है किन्तु न्याय, दंड, दाय और राजस्व पर यथाशक्य लिखने का प्रयास किया है। विधि संबंधी उसके इन विवरणों ने तत्कालीन व्यवहारों का कहाँ तक आँकलन किया है, उनका परीक्षण भारतीय धर्मशास्त्रों तथा अन्य विदेशी यात्रियों के विवरणों के आधार पर किया जा रहा है।

न्याय

न्याय के अन्तर्गत अलबीरूनी न केवल न्याय-प्रणाली पर लिखा है। न्यायकर्त्ताओं की नियुक्ति, योग्यता, उनकी संख्या तथा उनके द्वारा किए जानेवाले निर्णयों पर उसने कुछ नहीं लिखा है। इसी प्रकार उसने न्यायालय, प्रधान न्यायालय तथा उच्च न्यायालय और उनके विभिन्न न्यायधीशों का कोई भी संकेत नहीं दिया है।

लेख्यपत्र (डाकुमेन्ट)

अलबीरूनी ने न्यायाधीश द्वारा विवादों को सुनने और देखने की कार्यप्रणाली का उल्लेख किया है। उसने न्याय-प्रणाली के अन्तर्गत लेख्यपत्र, साक्षी और उनकी संख्या तथा शपथ और दिव्य प्रमाणों का वर्णन किया है। वह लिखता है कि "न्यायाधीश वादी से अभियुक्त व्यक्ति के विरुद्ध सुपाठ्य लिपि में लेख्यपत्र माँगता है जो इस प्रकार के लेखों के लिए उपयुक्त समझा जाता है और लेख्यपत्र में उसके आवेदन की सत्यता का सुप्रतिपादित प्रमाण चाहता है।[१]

नारद और कात्यायन को उद्धृत करते हुए अपरार्क ने लेख्यपत्र के महत्व पर प्रकाश डाला है तथा यह व्यवस्था दी है कि मौखिक प्रमाण लेख्यपत्रों के विरुद्ध अनुमत्य नहीं।[२] सोमदेव[3] ने लिखित प्रमाण को ही महत्त्व दिया है। भारतीय धर्मशास्त्रकारों ने कई प्रकार के लेख्यपत्रों का उल्लेख किया है, किसी ने दो[४] और किसी ने तीन। लेख्यपत्र के साधारणतः तीन रूप थे, एक, जनता के अधिकारियों द्वारा राजा के सम्मुख लिखा गया, दूसरा, साक्षियों द्वारा उपस्थित लेख और तीसरा बिना साक्षियों के।[५] बृहस्पति ने तीन प्रकार के लेख्यपत्रों का उल्लेख किया है।[६] मिताक्षरा के अनुसार लेख्यपत्र दो प्रकार के थे एक राजकीय और दूसरा जानपद।[७] लेख्यपत्र के वर्ण्य-विषय की वांछनीयता पर शुक्र का मत है कि संवत्, ऋतु, महीना, पक्ष, तिथि, समय, देश, विषय, स्थान, जाति, आकार, अवस्था और साध्य (दावे का द्रव्य आदि) प्रमाण द्रव्य, संख्या, अपना नाम, क्रम से राजाओं का नाम, निवास और साध्या का नाम, पितरों के नाम, पितामह और प्रपितामह के नाम एवं क्षमा आदि के अन्य चिह्न, इन सबको पक्ष (आवेदन) में कहकर लिखवाएँ। य सब जिसमें न लिखे जाँय उसे हीन लेख्यपत्र कहते हैं।[८] किन्तु अलबीरूनी ने लेख्यपत्रों के प्रकार और वर्ण्यविषय की कोई सूचना नहीं दी है।

साक्षी—

विवाद के निर्णय के लिए जब कोई लिखित प्रमाण नहीं मिलता तब साक्षी का सहारा लिया जाता है।[९] शुक्र का कथन है कि अपने से भिन्न कार्य का ज्ञाता साक्षी होता है।

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१. *Al.*, vol. ii, p. 100. (Albiruni's India—Sachan, London, 1910).

२. **अपरार्क,** पृ० ६९१-९२।

३. **नीतिवाक्यामृत,** पृ० २९८।

४. **नारद०** ४।१२५।

५. **विष्णुधर्मसूत्र** ७।३।

६. लेख्यं तु त्रिविधं प्रोक्तं भिन्नं तद्बहुधा पुनः। **बृहस्पति**—व्यवहार प्रकाश के पृ० १४१ पर उद्धृत। **व्यवहार मयूख,** पृ० २४।

७. **मिताक्षरा**—याज्ञ० २।८४।

८. **शुक्र०** ४।९३-९६।

९. **वही,** ४।९९-१००।

उसके दो भेद हैं: पहला, जिसने देखा हो, दूसरा, जिसने सुना हो। मेधातिथि के अनुसार वह प्रमाण जो किसी व्यक्ति ने स्वयं अपने कान से सुना हो और दूसरे व्यक्ति ने स्वयं अपनी आँख से देखा हो तो कान से सुनने वाला व्यक्ति साक्षी रूप में वैधानिक प्रमाण नहीं हो सकता।[१] विष्णुधर्म-सूत्र ने कान से सुननेवाले व्यक्ति को उसी स्थिति में प्रमाण रूप में स्वीकृत किया है, जब साक्षी रूप में निर्देशित किया गया व्यक्ति मर गया हो अथवा बाहर चला गया हो तो उससे सुनने वाला व्यक्ति प्रमाण दे सकता है[२]।

अलबीरूनी ने साक्षी के प्रकार पर नहीं लिखा है, पर साक्षी के आधार पर होनेवाले निर्णय का अवश्य निर्देश किया है। वह लिखता है कि लेख्यपत्र के अभाव में साक्षियों के आधार पर विवाद का निर्णय कर दिया जाता है[3]।

साक्षी की संख्या—साक्षियों की संख्या पर हिन्दू धर्म-विश्लेषकों का मतवैभिन्न्य है। मनु,[४] गौतम,[५] याज्ञवल्क्य,[६] नारद[७] आदि विधि-पंडितों के अनुसार कम से कम तीन साक्षी होने चाहिए। याज्ञवल्क्य पर टीका करते हुए विश्वरूप का भी यह मत है कि साक्षी तीन से कम न हों[८]। अलबीरूनी का कथन है कि "साक्षी चार से कम न हों, किन्तु वे अधिक हो सकते हैं। केवल उस स्थिति में जब किसी साक्षी का विवरण सही रूप में अपने सामने स्थापित हो तभी न्यायाधीश उसे स्वीकृत कर सकता है और प्रश्न का निर्णय इसी साक्षी के आधार पर कर सकता है। किन्तु वह गुप्त ढंग से भेद लेने, प्रकाश्य में संकेत और लक्षण मात्र से युक्तियाँ निकालने, एक बात से जो किसी दूसरे के विषय में निश्चित प्रतीत होती है निर्णय करने, और सचाई को निकालने के लिए सब प्रकार की ठग विद्या करने को तत्पर रहता है, जैसा कि इयास* इब्न मुआविय किया करता था।[९]

शुक्र का यह विकल्प है कि साक्षियों को बुलाकर गंगा आदि की सौगन्ध दे, पुराण के सत्य वचन तथा धर्म का माहात्म्य कहकर पूछे। झूठ बोलने में अत्यन्त दोषों से बारंबार भय दिखाए और शनैः शनैः इस प्रकार से पूछे कि किस-किस देश में किस काल में किस प्रकार किस कारण से तुमने इस विषय में क्या देखा, क्या सुना।[१०]

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१. समक्षदर्शनात्साक्षादनुभवाच्छ्रवणाच्च समक्षशब्दानुषंगः कर्त्तव्यः। यत् कुतश्चिदेकेन श्रूयते ततोन्येन तत्परंपराश्रुतं तेन परंपराश्रावी न साक्षी। **मेधातिथि-मनु०** ८.७५।

२. उद्दिष्टसाक्षिणि मृते देशान्तरगते वा तदभिहितश्रोतारः प्रमाणम्। **वि०ध०सू०** ८.१२।

३. Al., Vol II, P. 100.

४. **मनु०** ८.६०। ५. **गौतम०** १३.२०। ६. **याज्ञ०** २.६९-७०।

७. **नारद०** ४.१५३। ८. **मिताक्षरा-याज्ञ०** २.८७।

९. Al., Vol II, P. 150.

*. इयास इब्न मुआविय बस्र में उमैया खलीफा इब्न अब्दलज़ीज के अन्तर्गत न्यायाधीश पद पर था। उसकी मृत्यु १२२ हि० (७४० ई०) में हुई—Sachen : Al., II, P. 394.

१०. **शुक्र०** ४.७१६-७।

साक्षी की योग्यता और अयोग्यता तथा सभा में उनसे पूछे जाने वाले प्रश्नों पर हिंदू धर्मशास्त्र में विस्तार से विचार किया गया है, किन्तु अलबीरूनी ने इस सम्बन्ध में कोई चर्चा नहीं की है।

शपथ

मनु[1] का कथन है कि जब कोई साक्षी न हो तो शपथ के द्वारा सत्य का पता लगाना चाहिए। विश्वरूप[2] के अनुसार 'शपथ' 'दिव्य प्रमाण है। अलबीरूनी वादी और प्रतिवादी के शपथ लेने के उपक्रम की चर्चा करता है, कि 'यदि वादी अपना अधिकार नहीं सिद्ध कर पाता तो प्रतिवादी को शपथ लेनी पड़ती है, किन्तु यह कह कर वह वादी को भी शपथ दे सकता है कि "तूँ शपथ ले कि तेरा अधिकार सच्चा है और जिस चीज के लिए तूँ दावा करता है वह मैं तुझे दूँगा।[3]

सोमदेव का मत है कि विवाद को समाप्त करने में शपथ का प्रमुख स्थान है। उनके द्वारा विवृत्त शपथ का व्यवहार वर्णों के प्रमुख कर्म से प्रभावित था। न्यायालय में ब्राह्मण अपने पवित्र यज्ञोपवीत को स्पर्श कर अथवा स्वर्ण के टुकड़े को स्पर्श कर शपथ लें, क्षत्रिय शस्त्र को स्पर्श कर या आभूषण या भूमि को स्पर्श कर शपथ ले, वैश्य अपने कान अथवा स्वर्ण को स्पर्श कर शपथ ले तथा शूद्र दूध अथवा अन्न स्पर्श कर शपथ ले।"[4]

अलबीरूनी कहता है कि 'याचना के विषयगत मूल्य के अनुसार शपथ के अनेक प्रकार हैं। यदि विषय कोई बहुत महत्व का नहीं होता और वादी सहमत रहता है कि दोषी व्यक्ति शपथ खा ले तब बाद में प्रतिवादी पाँच ब्राह्मणों के सामने इन शब्दों में शपथ लेता है, 'अगर मैं झूठा हूँ तो हानि मूल्य के रूप में मैं अपने धन का उतना दूँगा जितना उसकी याचना के आठगुना के बराबर होगा।'[5]

दिव्य प्रमाण : विभिन्न प्रकार के शपथ और परीक्षण

प्राचीनकाल से हिन्दू समाज में सत्य को सिद्ध करने के लिए लोग दिव्य प्रमाणों के आधार पर शपथ ग्रहण करते थे। न्यायिक व्यवहारक्रम का दिव्य प्रमाण प्रमुख अंग था।[6] बृहस्पति[7] का यह कथन है कि जब लिखित प्रमाण और साक्षी किसी निश्चित तथ्य की ओर संकेत नहीं करते अथवा किसी भ्रममूलक अनुमान की ओर प्रेरित करते हैं तब विवाद को

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1. **मनु०** ८.१०९।
2. **मिताक्षरा-याज्ञ०** २.९६, **स्मृतिचन्द्रिका**, २.९६, **अपरार्क**, पृ० ६९४।
3. Al., Vol. II, p. p, 158
4. **नीतिवाक्यामृत**, पृ० ३०५-७।
5. Al, Vol. II., pp. 158-9
6. **नीतिवाक्यामृत**, पृ० ३००।
7. लिखिते साक्षिवादे च सन्दिग्धिर्यत्र जायते।
अनुमान च सम्भ्रान्ते तत्र दिव्य विशोधनम्॥ **बृहस्पति-व्यवहारमातृका**, पृ० ३३३ पर उद्धृत, **अपरार्क**, पृ० ६२९, **विवादचन्द्र**, पृ० १११।

दिव्य प्रमाणों के आधार पर निर्णीत करना चाहिए। ये दिव्य प्रमाण आठ प्रकार के थे, तुला, जल, विष, कोश, चावल, गर्म लोहा, अग्नि और लोहे का नोकील टुकड़ा।[१] बाण ने कादम्बरी में ऐसे दिव्य प्रमाणों का उल्लेख किया है।[२] अलबीरूनी ने भी सत्य की परीक्षा के लिए ऐसे कई दिव्य प्रमाणों का उल्लेख किया है।

विष देकर परीक्षण—कुछ विवादों में दोषी व्यक्ति को विष देकर उसकी सत्यता की परीक्षा की जाती थी। ह्वेनसांग कहता है कि विष के परीक्षण में वे भेड़ के दाएँ जाँघ में विष देते हैं। अगर प्रतिवादी दोषी होता है तो विष का प्रभाव होता है और पशु मर जाता है अगर वह निर्दोष होता है तो पशु नहीं मरता।[3] किन्तु उसका यह कथन भारतीय धर्मशास्त्रों से नहीं मिलता। इस परीक्षण के संबन्ध में अलबीरूनी का कथन भारतीय विवरणों से मिलता है। वह लिखता है कि यह 'एक ऊँचे किस्म का शपथ है। अभियोगी व्यक्ति को 'ब्रह्मण' नामक 'बीष' (विष) पीने के लिये बुलाया जाता है। यह बुरे प्रकारों में से है। लेकिन वह अगर सत्य बोलता है तो इसके पान से उसकी कुछ हानि नहीं होती।[४]

'ब्रह्मण' किस विष का नाम था, यह आज ज्ञात नहीं। 'शारंग (सृंग पौधा), या 'वत्सनाभ' (कुचला, एक प्रकार जहरीला पौधा) या 'हेमवत' नाम के विष परीक्षार्थ दिए जाते थे। मौसम अथवा ऋतु के अनुसार अभियोगी को विष देने का वजन कम-बेसी हुआ करता था। वर्षाकाल में छ: जव, गृष्मकाल में पाँच जव, हेमंत और शिशिर में सात अथवा आठ जव और शरद् में इससे कम विष नहीं दिया जाता था।[५] किन्तु मिताक्षरा[६] के अनुसार इस काल में छ: जव के वजन के अनुरूप विष होना चाहिए।

जल में परीक्षण—सत्य की परीक्षा जल में भी की जाती थी[७]। ह्वेनसांग लिखता है कि प्रतिवादी को बोरे में रखकर पत्थर की नाव के साथ पानी में फेंक दिया जाता है अगर व्यक्ति डूब जाता है और पत्थर तैरने लगता है तो वह दोषी समझा जाता है और अगर व्यक्ति तैरने लगता है और पत्थर डूब जाता है तो वह निर्दोष समझा जाता है।[८] किन्तु इस परीक्षा के संबंध में अलबीरूनी का विवरण भिन्न है। वह कहता है कि "परीक्षा का

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१. धटोग्निरुदकं चैव विषं कोशश्च पंचमः।
षष्ठं च ताण्डुलाः प्रोक्तं सप्तमं तप्तमाषकम्।
अष्टमं फाल मित्युक्तं नवमंधर्मजं भवेत्। **पितामह**-अपरार्क, पृ० ६९४ पर उद्धृत।

२. वनकरिणां वारिप्रवेशः······व्रतिनामग्निधारणं ग्रहाणां तुलारोहणमगस्त्योदये विषशुद्धिः। **कादम्बरी**, पैरा ४७।

3. *Watters*, I, p. 172; *Beal*, I, p. 84.

४. *Al* Vol, II, p. 159.

५. **विष्णुधर्मसूत्र**, १३।२-३। ६. **मिताक्षरा**–याज्ञ० २।१११।

७. **विष्णुधर्मसूत्र**, १२।७-८, **नारद**० ४।३१६-७।

८. *Watters*, I, 172; *Beal*, I, p. 84.

इससे भी उच्च प्रकार है : 'वे मनुष्य को एक गहरी और वेगवती नदी या बहुत पानी वाले गहरे कूएँ के पास ले जाते हैं। तब वह जल से कहता है, 'चूँकि तेरा संबंध निष्कलंक देवों से है और तूँ गुप्त और प्रकट सब कुछ जानता है, अतः यदि मैं झूठ कहता होऊँ तो तू मुझे मार डाल और यदि सत्य कहता होऊँ तो मेरी रक्षा कर। 'तब पाँच मनुष्य उसको पकड़ कर फेंक देते हैं। अगर उसने सत्य कहा है तो वह डूबे और मरेगा नहीं[१]। "याज्ञवल्क्य के अनुसार जलदेवता वरुण को संबोधित कर यह कहा जाता था कि 'हे वरुण, सत्य के द्वारा मेरी रक्षा कर'[२]। इस परीक्षण पर तथा विष के परीक्षण पर स्मृतिचन्द्रिका की यह समीक्षा है कि ये व्यवहार में नहीं[3]। किन्तु अलबीरूनी का कथन तत्कालीन समाज के व्यवहार को उद्घाटित करता है।

मंदिर में परीक्षण—पूज्य प्रतिमाओं के मंदिर में जाकर सत्य का पता लगाया जाता था। ये प्रतिमाएँ रुद्र, दुर्गा, आदित्य आदि की होती थीं[४]। प्रतिमा का स्नान और पूजन होता था तत्पश्चात् उस जल को शोध्य को पीने के लिए दिया जाता था। अगर उस व्यक्ति की इसके पीने से गंभीर स्थिति नहीं हो जाती थी अथवा उसके लड़के, पत्नी, निकटतम सम्बन्धियों के धन को कोई हानि नहीं पहुँचती थी तो वह अनभिज्ञ माना जाता था[५]। अलबीरूनी लिखता है कि "न्यायाधीश वादी और प्रतिवादी दोनों को नगर या देश की सबसे अधिक मान्य प्रतिमा के मंदिर में भेजता है। वहाँ प्रतिवादी को उस दिन उपवास करना होता है। दूसरे दिन वह नवीन वस्त्र धारण करता है और वादी के साथ उसी मंदिर में चौकी पर रहता है, पुजारी प्रतिमा पर जल डालता है और वह जल उसे पीने के लिए देता है, यदि उसने सत्य नहीं कहा तो तत्काल उसे रक्त का वमन होता है[६]।

तुला द्वारा परीक्षण—कुछ स्थितियों में शोध्य का तुला द्वारा परीक्षण किया जाता था। सर्वप्रथम शोध्य को तुला पर तौला जाता था। उसके निश्चित तौल पर चिह्न बना लिया जाता था, तत्पश्चात् उसे फिर तौला जाता था। अगर दुबारा तौल में उसका भार ऊपर की ओर चला जाता था तो वह निर्दोष समझा जाता था[७]। दुबारा तुलने के पूर्व शोध्य कहता था, 'ऐ तुला ! तुम सत्य की आवास हो। तुम देवों द्वारा इसी निमित्त बनाई गई हो। सत्य को घोषित करो और मुझे इस भ्रम से मुक्त करो। माँ ! अगर मैं दोषी हूँ तो मुझे नीचे की ओर कर दो, अगर निर्दोष हूँ तो ऊपर की ओर"[८]। किन्तु ह्वेनसांग का कथन है कि आदमी और पत्थर तुला पर बराबर तौल लिए जाते थे, अगर प्रतिवादी 'निर्दोष' होता

१. *Al*, Vol, II, p. 159.

२. **याज्ञ०** १।११० (गुरुमण्डल ग्रंथमाला)।

3. अथ जलविषयोरुत्सन्नानुष्ठानत्वात् तद्विधिमनाख्याय कोशविधिरुच्यते। **स्मृतिचंद्रिका,** २, पृ० ११६।

४. **विष्णुधर्मसूत्र** १४।४-५, **नारद०** ४।३३०।

५. **याज्ञ०** २।११३।

६. *Al*, Vol II, p. 159.

७. **नारद०** ४।२७६-९, **विष्णुधर्मसूत्र** १०।९-११।

८. **याज्ञ०** २।१०१-२।

तो पत्थर का भार तुला में बढ़ जाता[३] और अगर वह दोषी होता तो व्यक्ति का भार बढ़ जाता[१]। इस सम्बन्ध में अलबीरूनी का कथन भारतीय विवरण के अनुरूप है। वह कहता है कि "प्रतिवादी को तराजू के पलड़े पर रखकर तौला जाता है। इसके बाद उसे तराजू पर से उतार लिया जाता है और तराजू को ज्यों का त्यों छोड़ दिया जाता है। तब वह अपने साक्षित्व की सचाई के लिए साक्षियों के रूप में अमूर्त्त प्राणियों, देवों, दिव्य सत्ताओं को एक दूसरे के पश्चात् आह्वान करता है और जो कुछ वह बोलता है, वह सब एक कागज के टुकड़े पर लिखकर अपने सिर के साथ बाँध लेता है। उसे फिर तराजू के पलड़े पर रखा जाता है। यदि उसने सत्य कहा तो उसका वजन पहली बार की अपेक्षा ऊपर उठ जाता है[२]। "निश्चय ही शोध्य का वजन ऊपर उठ जाने पर निर्दोष घोषित किया जाता था[३]"। तुला प्रमाण का अभिलेखीय उदाहरण भी मिलता है। जयपालदेव के समय के सिलिमपुर प्रस्तर अभिलेख में इसका उल्लेख हुआ है[४]।

तप्तमास का परीक्षण—सोलह अंगुल घिराई और चार अंगुल गहराई के ताम्र अथवा लौह-पात्र में घी और तेल खूब उबाला जाता था तब उसमें न्यायाधीश स्वर्ण पत्र डालता था। शोध्य को उस उबलते घी और तेल में से उस स्वर्ण पत्र को निकालना होता था अगर वह विना किसी तकलीफ के निकाल लेता और उसकी उँगलियों को कोई हानि नहीं पहुँचती तो वह निर्दोष घोषित किया जाता[५]। अलबीरूनी लिखता है कि 'वे घी और तिल का तेल बराबर लेकर एक देकची में उबालते हैं। तब वे उसमें एक पत्ता डालते हैं, जिसके पिलपिला और दग्ध हो जाने से वे समझते हैं कि मिश्रण उबलने पर आ गया है। जब उबलने की क्रिया परिणति पर रहती है तब वे उसमें स्वर्ण पत्र छोड़ते हैं और प्रतिवादी को हाथ से बाहर निकालने की आज्ञा देते हैं। अगर वह सत्य रहता है तो वह उसे निकाल लेता है"[६]। इस सम्बन्ध में अरब यात्री सुलेमान का आँख देखा विवरण अलबीरूनी के उपरिलिखित उल्लेख से कुछ भिन्न है। उसके अनुसार, खौलते हुए घी और तेल के स्थान पर, खौलता हुआ गरम पानी रहता था तथा स्वर्ण पत्र के स्थान पर लोह छल्ला। वह लिखता है कि "भारत में कभी ऐसा भी होता है कि लोहे या ताँबे के बरतन में पानी खूब खौलाया जाता है, यहाँ तक कि कोई उसको छू भी नहीं सकता। उस पानी में फिर एक लोहे का छल्ला डाला जाता है। दोषी से कहा जाता है कि वह हाथ डालकर उस छल्ले को पानी से निकाले। मैंने स्वयं अपनी आँखों से देखा है कि एक मनुष्य ने हाथ डालकर छल्ले को निकाला किन्तु उसको कुछ हानि नहीं पहुँची। ऐसी दशा में दोषारोपण करने वाले को एक मन सोना देना पड़ता है"[७]। ये विवरण इस बात के प्रमाण हैं कि तत्कालीन भारतीय समाज में दिव्य प्रमाण का यह प्रकार प्रचलित था।

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१. *Walters* I, p. 172; *Beal* p. 84.
२. *Walters* II, p. 159.
३. **व्यवहारमयूख**, पृ० ६०।
४. *EI*, *XIII*, p. 283, 291-2.
५. *HDS*, III, p. 394.
६. *AI*, II, p. 159-60.
७. **सुलेमान सोदागर**, पृ० ७५।

तप्त लौह का परीक्षण—तपते हुए लोहे को हाथ पर लेकर परीक्षण की विधि हिन्दू समाज के व्यवहार में थी।[१] इस व्यवहार में शोध्य के हाथ पर कुछ धान के दाने और उसके ऊपर अश्वत्थ वृक्ष की सात पत्तियाँ रखकर तप्त लौह का टुकड़ा रखा जाता था। तत्पश्चात शोध्य उसे पकड़े हुए धीरे-धीरे पहले से आठवें वृत्त तक चलता था।[२] नौवें वृत्त पर वह उस तप्त लोहे को फेंक देता था। अगर उसके हाथ को कुछ हानि नहीं पहुँचती थी तो वह अनभिज्ञ घोषित किया जाता था।[3] ह्वेनसांग का कथन है कि वे लोहे के पत्तर को गरम करते हैं और प्रतिवादी को इस पर बैठने के लिए कहते हैं, फिर उसे उसके हाथ की हथेली पर रखते हैं। इसी प्रकार वह अपनी जिह्वा पर उसे रखता है। अगर इससे उसे कोई दुख नहीं पहुँचता तो वह अनभिज्ञ समझा जाता, अगर उसे दुख पहुँचा तो वह दोषी माना जाता।[४] इस दिव्य प्रमाण के संबन्ध में अलबीरूनी का विवरण भारतीय शास्त्रकारों के अनुरूप है। वह लिखता है कि 'वे लोहे के एक टुकड़े को इतना गरम करते हैं कि वह पिघलने के निकट पहुँच जाता है। तब उसे चिमटे से पकड़ कर प्रतिवादी के हाथ पर रख दिया जाता है। लोहे और उसके हाथ के बीच किसी पेड़ के चौड़े पत्ते और उसके नीचे कुछ थोड़े से और बिखरे हुए चावलों के धानों के सिवा और कुछ नहीं होता। वे इसको सात पग ले जाने की आज्ञा देते हैं और इसके पश्चात् वह चाहे तो भूमि पर गिरा दे।'[५] अलबीरूनी का यह विवरण, उसके पूर्ववर्ती ९वीं सदी के अरबयात्री सुलेमान के इस कथन से थोड़ा मिलता है कि भारत में जब कोई मनुष्य किसी दूसरे पर ऐसा दोषारोप करता है जिसमें वह मृत्यु का अधिकारी हो तब ऐसे समय में उस दोषी को अग्नि उठाने के लिए कहा जाता है। वह यदि इस बात को स्वीकार कर लेता है तो फिर लोहे का एक टुकड़ा खूब गर्म किया जाता है यहाँ तक कि उससे आग निकलने लगती है। उसके पश्चात् उसके खुले हाथ पर किसी वृक्ष की सात पत्तियाँ रखी जाती हैं। इन पत्तियों के ऊपर दहकता हुआ लोहे का गर्म टुकड़ा रख दिया जाता है। वह इस टुकड़े को लेकर कुछ देर तक टहलता है, बाद में फेंक देता है। फिर चमड़े के एक थैले में उसका हाथ डाल दिया जाता है और उस पर सम्राट् की मुहर लगा दी जाती है। तीन दिन बीत जाने के पश्चात् जब वह इस बात का परिचय देता है कि उसे कुछ कष्ट नहीं पहुँचा तब उसका हाथ खोल दिया जाता है। यदि उसके हाथ को कुछ कष्ट नहीं पहुँचा होता तो वह छोड़ दिया जाता है और मृत्यु के घाट नहीं उतारा जाता, बल्कि जुरमाने के तौर पर एक मन सोना दोषारोपण करने वाले को बादशाह के कोष में दाखिल करना पड़ता है।[६]

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१. **विष्णुधर्मसूत्र** ११.११-१२।

२. अथ सप्ताश्वत्थपर्णान्तरितं षोडशपलमग्निवर्णं लौहपिण्डमंजिलनादाय सप्त मर्यादां गच्छेत। **शंखलिखित**-स्मृतचन्द्रिका २, पृ० ११२ पर उद्धृत। **व्यवहारप्रकाश,** पृ० १९६।

3. **याज्ञ०** २.१०४।

4. Watters, I. p. 172; Beal, I, p. 84.

5. Al., Vol. II, p. 160.

६. **सुलेमान सौदागर,** पृ० ७४।

प्राचीन प्रथा यह थी कि 'दिव्य' साक्ष्य का प्रमाण भी था और साथ ही साथ दंड भी। उससे मुक्ति हो जाने पर प्रतिवादी के लिए वह प्रमाण था और विपरीतावस्था अर्थात् शारीरिक हानि के होने पर दण्ड था। उसके बाद कोई अन्य दण्ड नहीं दिया जाता था।

दण्ड

अलबीरूनी के अनुसार समाज में बहुत से अज्ञानी और भूल करनेवाले हैं जो खड्ग और कोड़े के बिना सन्मार्ग पर नहीं रखे जा सकते।[१] निश्चय ही अगर देखा जाय तो ऐसे लोग प्रत्येक युग में और प्रत्येक समाज में वर्तमान रहे हैं, जिनके अपराधों को अवरुद्ध करने के निमित्त समाज में दण्ड की व्यवस्था की गई। व्यक्ति के अपराधी सिद्ध होन पर हिन्दू व्यवहार में कई प्रकार के दण्ड की व्यवस्था थी। व्यक्ति के अपराध की गंभीरता अथवा हल्केपन पर ध्यान रखकर दण्ड दिया जाता था। जो जितना गंभीर अपराध करता था, उसे उतना ही गंभीर दण्ड दिया जाता था। दण्ड देने में अपराध की प्रकृति को ध्यान में रखते हुए देश, काल, कर्म, वर्ण, वय, विद्या, स्थान विशेष, शक्ति, वित्त आदि पर विचार किया जाता था।[२] इस प्रकार समाज में दंड अनेक प्रकार के दिए जाते थे, वाग्दण्ड, धिग्दण्ड, अर्थदण्ड, रोधन, बंधन, अंगताडन अंगभंग, निर्वासन, तथा प्राणदण्ड आदि। मनु[3], याज्ञवल्क्य[४], बृहस्पति[५] आदि ने दण्ड के चार प्रकार बताए हैं, धिग्दण्ड, वाग्दण्ड, धनदण्ड और वध।

अलबीरूनी ने दण्ड के विषय में भारतीय शास्त्रकारों के अनुसार विस्तार से नहीं लिखा है। उसने केवल वध, चोरी और स्त्री के व्यभिचार करने पर दिए जाने वाले दण्ड का संक्षेप में वर्णन किया है। यहाँ मैं उसी के आधार पर दण्ड व्यवस्था को विवृत्त कर रहा हूँ।

चोरी का दण्ड

चोरी के अपराध के सम्बन्ध में लिखता हुआ अलबीरूनी धिग्दंड, वाग्दंड, अर्थदण्ड, अंगछेदन और वध का उल्लेख करता है। वह लिखता है कि "चोरी का दण्ड चुराई हुई वस्तु के मूल्य के अनुसार होना चाहिए, जिसके अनुसार कभी तो अत्यंत या मध्यम कड़ाई का

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१. *Al*, Vol. II, p. 161.

२. **कृत्यकल्पतरु**, व्यवहारकांड, पृ० ७७८, देखिए, **याज्ञ०** १।३६८।

3. मनु० ८।१२९।

४. धिग्दण्डस्त्वथ वाग्दण्डो धनदण्डो बधस्तथा।
योज्या व्यस्ताः समस्ता वा अपराधवशादिमे ।। याज्ञ० १।३६७।

५. गुरू-पुरोहितान्पुत्रान्वाग्दण्डेनैव दण्डयेत।
विवादिनो नरांश्चान्यान्धिग्धनाभ्यां च दण्डयेत् ।।
महापातकयुक्तांश्च वधदण्डेन दण्डयेत्। **बृहस्पति**—स्मृतिचन्द्रिका, २, पृ० १२९ पर उद्धृत, **व्यवहार निर्णय**, पृ० ५२८।

दण्ड आवश्यक है, कभी ताड़न और कभी अर्थदण्ड तथा कभी केवल सबके सामने लज्जित करना और हँसी उड़ाना ही। यदि वस्तु बहुत बड़ी हो तो राजा ब्राह्मण को अंधा और उसके अंग का छेदन कर देता है। वह उसका बायाँ हाथ और दायाँ पैर या दायाँ हाथ और बायाँ पैर काट डालता है। किन्तु वह क्षत्रिय का अंगछेदन उसको अंधा किए बिना ही कर देता है और अन्य वर्णों के चोरों को मार डालता है"[१]।

चोरी के अपराध में गौतम[२] और मनु[३] का कथन है कि शुद्र को दिए जाने वाले दण्ड का वैश्य, क्षत्रिय और ब्राह्मण को क्रमानुसार दो बार, चार और आठ बार का अर्थदण्ड देना चाहिए। चोरी के अपराध में अंगछेद (हाथ, पैर या उँगलियाँ काटना) की व्यवस्था अत्यन्त साधारण थी[४]। शुक्र[५] ने चोर को निर्वासन का दण्ड निर्देशित किया है। अगर बहुमूल्य आभूषणों की चोरी हुई हो तो ऐसी अवस्था में मृत्युदंड भी दिया जाता था।[६] कौटिल्य[७] का कथन है कि चोरी के प्रथम अपराध में चोर का अँगूठा और एक उँगली काट दी जाय या ५४ पण अर्थदण्ड दिया जाय, दूसरी बार के अपराध में उसकी सारी उँगलियाँ काट दी जायँ या १०० पण अर्थदण्ड दिया जाय, तीसरी बार के अपराध में उसका दायाँ हाथ काट दिया जाय या ४०० पण अर्थदण्ड दें और चौथी बार के अपराध में राजा के निर्देशानुसार मृत्यु दण्ड दिया जाय। आपस्तम्ब धर्मसूत्र से विदित होता है कि चोरी के अपराध में ब्राह्मण की आंखें जीवन पर्यन्त के लिए बाँध देनी चाहिए तथा अन्य तीन वर्णों को मृत्यु दण्ड देना चाहिए।[८] किन्तु अलबीरूनी का कथन है कि ब्राह्मण-क्षत्रिय के अतिरिक्त अन्य दो वर्णों को मृत्युदण्ड देना चाहिए। ऐसा लगता है अलबीरूनी के समय चोरी के दण्ड में अंगछेदन अधिक किया जाता था। धर्मसूत्रकालीन व्यवस्था यह थी कि ब्राह्मण के अतिरिक्त अन्य तीनों वर्णों को मृत्यदण्ड देना चाहिए, किन्तु यह विकल्प अलबीरूनी के काल में केवल अन्य दो वर्णों वैश्य और शुद्र के लिए ही रह गया।

हत्या का दण्ड

अलबीरूनी लिखता है कि "यदि हत्यारा ब्राह्मण हो और मारा गया हुआ व्यक्ति किसी दूसरे वर्ण का हो तो उसे उपवास, प्रार्थना और दान के रूप में केवल प्रायश्चित ही

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१. *Al*, Vol II, p. 162.

२. **गौतम०** १२।१५-१६।

३. अष्टापाद्यं तु शुद्रस्य स्तेये भवति किल्विषम्।
षोडशैव तु वैश्यस्य द्वात्रिंशत्क्षत्रियस्य च॥
ब्राह्मणस्य चतुः षष्टिः पूर्णं वापि शतं भवेत।
द्विगुणा वा चतुः षष्टिस्तद्दोषगुण विद्धि सः॥ **मनु०** ८।३३७-८ (गुरुमंडल ग्रंथमाला)

४. **मनु०** ९।२७६-७, **नारद०** (परिशिष्ट) ३२, **याज्ञ०** २।२७४।

५. **शुक्र०** ४।

६. **मनु०** ८।३२३।

७. **कौ० अ०** ४।१०।

८. २।१०।२७।१६-१७।

करना पड़ता है"। अलबीरूनी का यह कथन सही है। ब्राह्मणों को प्राचीनकाल से दण्ड व्यवस्था में विशेष सुविधाएँ प्राप्त थीं। अपने से निम्न वर्ण की हत्या करने के अपराध में उन्हें मृत्य दण्ड नहीं दिया जाता था। गौतम, कौटिल्य, मनु, याज्ञवल्क्य, नारद, विष्णु, वृद्धहारीत आदि लेखकों के अनुसार ब्राह्मण को मृत्युदण्ड की व्यवस्था नहीं थी।[१] कौटिल्य का यह विधान है कि हत्या के अभियोग में ब्राह्मण के मस्तक पर कबन्ध का चिह्न लोहे से दाग देना चाहिए।[२] यम को उद्धृत करते हुए स्मृतिचंद्रिका का यह विधान है कि ब्राह्मण को मृत्यु दण्ड से मुक्त रखना चाहिए।[३]

अलबीरूनी आगे कहता है कि 'यदि मारा गया व्यक्ति ब्राह्मण है तो ब्राह्मण हत्यारे को अगले जन्म में इसका उत्तर देना होगा इसलिए उसे प्रायश्चित करने की आज्ञा नहीं दी जाती, कि प्रायश्चित से पापी का अपराध समाप्त हो जाता है, किंतु कोई भी वस्तु ब्राह्मण से किसी मृत्यु के अपराध को नहीं समाप्त कर सकती। इन अपराधों में सबसे बड़े ये हैं—ब्राह्मणहत्या, गोहत्या, सुरापान, व्यभिचार, विशेषकर अपने पिता और गुरु की पत्नी के साथ। किंतु राजा लोग इन अपराधों में से किसी के लिए भी ब्राह्मण या क्षत्रिय को नहीं मारते, बल्कि उसकी संपत्ति का अपहरण करके उसे अपने देश से निर्वासित कर देते हैं।[४]

मनु का कथन है कि "समस्त पाप करनेवाले ब्राह्मण का भी राजा कभी बध न करे, किंतु संपूर्ण धन के साथ आयात शरीर वाले उस (ब्राह्मण) को राज्य से निर्वासित कर दे।"[५] इस संबन्ध में वृद्धहारीत की भी ऐसी ही मिलती जुलती व्यवस्था है कि "हत्या के अपराध में ब्राह्मण को उसके सिर के बाल मूड़कर तथा उसकी संपत्ति से उसे वंचित करके राज्य से निकाल देना चाहिए"।[६] राजतरंगिणी से विदित होता है कि कश्मीर के राजा चंद्रापीड़ के शासनकाल में एक ब्राह्मण हत्यारे को ब्राह्मण की हत्या के अभियोग में स्मृति नियम के अनुसार छोड़ दिया गया।[७] किन्तु विश्वरूप ने कात्यायन का उद्धरण दिया है जिसके अनुसार उस ब्राह्मण को प्राण-दण्ड भी मिल सकता है जिसनें गर्भपात कराया हो, या वह चोर हो, या उसने तीक्ष्ण शस्त्र से ब्राह्मण स्त्री की हत्या की हो या उसने पतिव्रता स्त्री का वध किया हो।[८]

अलबीरूनी आगे कहता है कि यदि ब्राह्मण और क्षत्रिय से निम्न वर्ण का व्यक्ति उसी वर्ण के किसी मनुष्य की हत्या कर दे तो उसे प्रायश्चित करना पड़ता है, किन्तु इसके अतिरिक्त उदाहरण प्रतिष्ठित करने के उद्देश्य से राजा लोग उसे दण्ड भी देते हैं"[९] कौटिल्य का

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१. गौतम० १२।४३, कौ० अ० ४।८, मनु० ८।१२५, ३८०-१, याज्ञ० २।२७७, नारद (साहस) ९-१०, विष्णु० ५।१-८, वृद्धहारीत० ७।१९१।

२. **कौ०अ०** ४.८।

३. **स्मृतिचन्द्रिका**, पृ० ३१७।

४. *Al.*, Vol. II p. 162.

५. **मनु०** ८.३८१।

६. ७.२०९-१०।

७. **राजतरंगिणी** ४.९६-१०६।

८. गर्भस्य पातने स्तेनो ब्राह्मण्यां शस्त्रपातने।
अदुष्टां यौषितं हत्वा हन्तव्यो ब्राह्मणे पि हि॥ **कात्यायन**—विश्वरूप द्वारा उद्धृत, याज्ञ० २·२८१।

९. *Al*, Vol. II, p. 162.

कथन है कि अगर कोई व्यक्ति किसी की हत्या कर देता है तो उसे मृत्यु दण्ड दिया जाय। वृद्धहारीत ने मृत्युदण्ड की व्यवस्था उन लोगों के लिए निर्देशित की है जो जानकर आग लगाने वाले हों, विष देने वाले हों, हत्यारे हों, लुटेरे हों, व्यभिचारी हों अथवा धूर्त हों।[२] विष्णुधर्मसूत्र के अनुसार ब्राह्मण को छोड़कर महापातक के सभी अपराधियों को मृत्यु दण्ड दिया जाय।[3]

प्राचीन और मध्ययुगीन समाज में साधारणतः यह व्यवस्था थी कि ब्राह्मण के अतिरिक्त अन्य वर्णों के लोगों को हत्या के अपराध में मृत्यु दण्ड दिया जाता था। किन्तु अलबीरूनी के उपरिलिखित कथन से यह स्पष्ट होता है कि ब्राह्मण, क्षत्रिय के अतिरिक्त अन्य वर्ण के लोगों को अपने वर्ण के किसी व्यक्ति के हत्या करने के अभियोग में, कड़ाई के साथ मृत्युदण्ड नहीं मिलता था।

दाय

पैतृक संपत्ति में दाय भाग को लेकर पूर्वमध्ययुगीन विद्वान् विज्ञानेश्वर और जीमूतवाहन ने अपने-अपने संप्रदाय का प्रतिनिधित्व करते हुए भिन्न-भिन्न रूपों में विचार किया है। मिताक्षरा के अनुसार दाय वह संपत्ति है, जिस पर उसके स्वामी के सम्बन्ध मात्र के कारण ही दूसरे व्यक्ति का स्वामित्व स्थापित हो जाता है।[४] पिता की सम्पत्ति पर पुत्र का अधिकार स्वभावतः है जो जन्म के कारण सम्बद्ध है, इसी कारण संपत्ति पर जन्म से उसका अधिकार है। इस सम्बन्ध में जीमूतवाहन का यह मत है कि जो दिया जाय, वह दाय है, दान में देने वाला व्यक्ति अपने स्वत्व का परित्याग करता है, अतः उसके स्वत्व त्याग से नए व्यक्ति के अधिकार की उत्पत्ति होती है।[५] स्पष्ट है कि संपत्ति में नए व्यक्ति को स्वत्व उसी स्थिति में मिल सकता है जब उस पर से पूर्ववर्ती का स्वत्व निवृत्त हो जाय।

पुरुष का दाय-स्वत्व

विष्णुधर्मसूत्र,[६] याज्ञवल्क्य,[७] वृहस्पत्ति,[८] कात्यायन[९] और व्यास[१०] के मतानुसार दाय

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१. **कौ० अ०** ४।११। २. ७।१९०। ३. ५।१।

४. तत्र दायशब्देन यद्धनं स्वामि संबन्धादेव निमित्तादन्यस्य स्वं भवति तदुच्यते। **मिताक्षरा**—याज्ञ० २।११४।

५. दीयते इति व्युत्पत्या दायशब्दो ददाति प्रयोगश्च गौणः मृतप्रव्रजितादिस्वत्वनिंवृत्ति-पूर्वकपरस्वत्वोत्पत्तिफलसाम्यात्, न तु तत्र मृतादीनां त्यागोस्ति। ततश्च पूर्व-स्वामिसम्बन्धाधीनं तत्स्वाम्योपरमे यत्र द्रव्ये स्वाम्यं तत्र निरूढो दायशब्दः। **दायभाग** १।४-५।

६. पैतामहेर्ये पितृपुत्रयोस्तुल्य स्वामित्व। **विष्णुधर्मसूत्र** १७।२।

७. भूर्या पितामहोपात्ता निबन्धो द्रव्यमेव वा।
तत्र स्यात्सदृश स्वाम्यं पितुः पुत्रस्य चैव हि। **याज्ञ०** २।१२१।

८. **वृहस्पति**—दायभाग, २।५० पर उद्धृत।

९-१०. **कात्यायन** और **व्यास**—अपरार्क, पृ० ७२५ पर उद्धृत।

की संपत्ति में पुत्र और पिता का एक जैसा स्वामित्व है। अतः पुत्र का अधिकार जन्म से ही हो जाता है। इस सम्बन्ध में अलबीरूनी का मत भारतीय विचारकों के अनुरूप ही हैं। वह लिखता है कि पूर्वजों अर्थात् पिता और पितामह की अपेक्षा वंशज, अर्थात् पुत्र और पौत्र दाय पर निकटतर अधिकार रखते हैं। फिर, पूर्वजों और वंशजों में एकहरे सम्बन्धियों के विषय में, जिस मनुष्य का सम्बन्ध जितना अधिक निकट का है उतना ही अधिक उसका दाय पर अधिकार है। इस प्रकार पौत्र की अपेक्षा पुत्र का और पितामह की अपेक्षा पिता का अधिकार निकटतर है"।[१]

मिताक्षरा[२] के अनुसार पुत्र का जन्म से ही पिता की संपत्ति में अधिकार हो जाता है, किन्तु दायभाग[३] के अनुसार पिता के मरने के उपरान्त पुत्र का पिता की संपत्ति में अधिकार होता है। पिता अपने जीवन काल में चाहे तो सारी सम्पत्ति बेंच सकता है या दान कर सकता है या किसी को लिख सकता है। एसी स्थिति में पुत्र को कोई अधिकार नहीं कि वह कुछ कर सके।

अलबीरूनी लिखता है कि "सपिण्ड सम्बन्धियों जैसे भाइयों का अधिकार कम है, और उनको केवल उसी अवस्था में दाय मिलता है जब उनसे अच्छा अधिकार रखने वाला कोई न हो। अतः यह स्पष्ट है कि बहिन के पुत्र की अपेक्षा पुत्री के पुत्र का अधिकार अधिक है, और भाई का पुत्र इन दोनों से बढ़कर अधिकार रखता है"।[४]

मनु[५] ने कन्यापुत्र (दौहित्र) द्वारा अपुत्र पिता को पिण्ड देने तथा संपत्ति ग्रहण करने का उल्लेख किया है। बृहस्पति ने साधिकार यह व्यवस्था की है कि जैसे कन्या पितृपक्ष के बधुओं के होते हुए भी दायाद होती है वैसे ही उसका पुत्र भी अपनी माता और नाना की संपत्ति का अधिकारी होता है।[६] विज्ञानेश्वर ने भी दौहित्र के स्वत्व की पुष्टि की है।[७]

माता-पिता के अभाव में भाई का निःसंतान भाई की संपत्ति में अधिकार होता।[८] मिताक्षरा ने अपनी समीक्षा में यही व्यवस्था दी है।[९] समीक्षा करते हुए विज्ञानेश्वर का यह कथन है भाइयों के अभाव में उनके पुत्र (भतीजे) तथा इनके अभाव में भतीजे के लड़के उत्ताराधिकारी होते हैं। इन तक बद्धक्रम या निश्चित व्यवस्था समझी जाती है।[१०]

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१. *Al*, Vol II, p. 164.

२. मिताक्षरा—यज्ञ० २।११४।

३. **दायभाग**, २।२८-३०।

४. *Al.*, Vol. II, pp. 164-65.

५. **मनु०** ९.१३१-३२, १३६।

६. यथा पितृधने स्वाम्यं तस्या सत्स्वपि बन्धुषु।
तथैव तत्सुतो पीष्टे मातृमातामहे ॥ **बृहस्पति**—दायभाग, पृ० १८० पर उद्धत।

७. **मिताक्षरा** याज्ञ० २.१३५।

८. **याज्ञ०** २.१३५।

९. **मिताक्षरा**—याज्ञ० २.१३५।

१०. **वही।**

अलबीरूनी लिखता है कि "यदि मृत कोई उत्तराधिकारी नहीं छोड़ जाता तो दाय राजा के कोष में चला जाता है—केवल उस अवस्था को छोड़कर जब मृत व्यक्ति ब्राह्मण हो। उस दशा में राजा को दाय में हाथ डालने का कोई अधिकार नहीं। यह केवल दान-पुण्य में व्यय कर दिया जाता है।[1]

आपस्तंब[2], बौधायन[3] तथा वसिष्ठ[4] का कथन है कि मरे हुए व्यक्ति का कोई उत्तराधिकारी न होने पर संपत्ति राजा को मिलती है। मनु ने भी मृत व्यक्ति के उत्तराधिकारी के अभाव में संपत्ति राजा को मिलने की पुष्टि की है।[5]

अलबीरूनी के विवरण से स्पष्ट है कि मृत ब्राह्मण की संपत्ति राजा नहीं लेता था वह संपत्ति बाद में दानादि कर्म में बँट जाती थी।

राजस्व

राजा की आय का प्रमुख साधन राजस्व था। यह प्रधानतः दो प्रकार का था भमिकर और विक्रय कर। भूमिकर में भी कई प्रकार के कर थे, भाग, भोग, उद्रंग, उपरिकर, हिरण्य आदि। विक्रय कर में 'शुल्क' प्रमुख था।

अलबीरूनी ने केवल 'भाग' और 'शुल्क' का उल्लेख किया है। वह लिखता है कि जो कुछ वह फसलों से या पशुओं से कमाता है, उस संबन्ध में सबसे पहले वह देश के शासक को कर देने के लिए बाध्य है जो कृषि-भूमि या गोचारण भूमि के साथ लगा रहता है। फ़िर, आय का छठाँ भाग (१।६) राजा को प्रजा अपनी संपत्ति, और अपने परिवारों की रक्षा के बदले देती है। यही कर्तव्य साधारण जनता के सिर पर भी है, किन्तु वे अपनी संपत्ति के सम्बन्ध में घोषणाएँ करते हुए झूठ बोलते हैं और छल करते हैं। ऐसे ही समान तर्क पर व्यापारी लोग भी राजस्व देते हैं।[6]

उत्पादन का १।६ भाग राजस्व रूप में देने का प्राचीन भारतीय शास्त्रकारों ने भी समर्थन किया है। इस सम्बन्ध में अलबीरूनी का कथन भारतीय विचारकों के अनुरूप है। गौतम[7], मनु[8], और विष्णुधर्मसूत्र[9] का यह विधान है कि उत्पादन का १।६ भाग राजा ले। मध्यकालीन लेखक लक्ष्मीधर ने बिना अपना कोई मत प्रकट किए मनु, बृहस्पति, विष्णु और गौतम को उद्धृत किया है, जिनके अनुसार भूमिकर १।६, १।८, १।१२ (मनु के अनुसार) या १।६, १।८ या १।१० (गौतम और बृहस्पति के अनुसार) अथवा १।६ (गौतम के अनुसार) होना चाहिए।[10] सोमेश्वर ने भी अपना कोई मत नहीं प्रकट किया है। उसने १।६, १।८ या १।१२ भाग का निर्देश किया है। भूमि की उपज पर लगनेवाला यह कर

1. *Al.*, Vol. II, p. 165.
2. २.६.१४.२-५।
3. १७.८१-८४।
4. १.५.१-१३।
5. ९.१८५-९।
6. *Al.*, Vol. II, p. 149.
7. १०.२४।
8. ३.२२।
9. ३.२२-३।
10. **कृत्यकल्पतरु**, राजधर्मकाण्ड, पृ० ८८-९२।

अवस्थाओं के भेद से भिन्न भिन्न हुआ करता था और इसका भेद काफी था—$\frac{1}{4}$ से $\frac{1}{12}$ तक। परन्तु साधारणतः यह $\frac{1}{6}$ ही होता था। इसी नाते 'षडंशवृत्ति' (भूमि की उपज का $\frac{1}{6}$ वृत्ति हो जिसकी) और षड्भागवृत्त शब्द (उपज के $\frac{1}{6}$ से अपना भरण करनेवाला) राजा के लिए रूढ़ार्थ रूप प्रयुक्त होने लगे।

भूमिकर के लिए अनेक ऐसी स्थितियाँ थीं जो भूमि की क्षमता, सिचाई के साधनों की सुलभता तथा उत्पादन शक्ति की प्रचुरता पर अवलंबित थीं। मनु[२] और कौटिल्य[3] के अनुसार आपत्तिकाल में उपज का १।३ या १।४ राजा ले सकता है, किन्तु ऐसे विकल्पों की अलबीरूनी ने कोई सूचना नहीं दी है।

'शुल्क' साधारणतः व्यापारिक वस्तुओं पर कर रूप में लगता था। राज्य के बाहर से आने-जाने वाली वस्तुओं पर शुल्क लगने का विधान था।[४] शुल्क कितना लगता था, अलबीरूनी ने इसकी कोई सूचना नहीं दी है। सामान्यतः शुल्क दो तरह का लगता था, एक स्थल मार्ग पर और दूसरा जलमार्ग पर।[५] गौतम[६] और विष्णुधर्मसूत्र[७] के अनुसार व्यापारिक माल के लाभ पर शुल्क १।२० लगता था जो मूल्य का ५ प्रतिशत कहा जाता था, जिसे राजा शुल्क के रूप में लेता था। राजनीतिप्रकाश[८] के अनुसार व्यापारिक माल के मूल मूल्य और विक्रय मूल्य के बीच ५ प्रतिशत शुल्क लगता था। याज्ञवल्क्य का विकल्प है कि शुल्क माल के मूल्य का १।२० भाग लगना चाहिए।[९]

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१. **मानसोल्लास**, विंशति, २, ३.१६३-४।
२. १०.११८।
3. ५.२।
४. **शुक्र** ४.२.१०८।
५. **मिताक्षरा**—याज्ञ० २.२६३।
६. १०.२६।
७. ३.२९। of Hindu Polity, p. 339.
८. पृ० २६४।
९. २.२६१।

MAGNETIC ENERGY OF THE EARTH'S CORE

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[An attempt has been made to give a critical review of the recent work done regarding the generation of magnetic energy in the core of the Earth.

The principle of Self-exciting dynamo is described and it has been shown that it can give rise to a magnetic field. Analogously, it is quite interesting to bring out, how this dynamo action can be visualised in the case of the Earth's core, to explain certain features of earth's magnetic field.

The secular variation and westward drift are described and it is shown that these can be connected with probable motions in the core of the Earth. Theoretical explaination of some problems is also given.]

1. *Dynamo Theory :—*

To explain the dynamo theory, let us take the simple model indicated in the figure 1
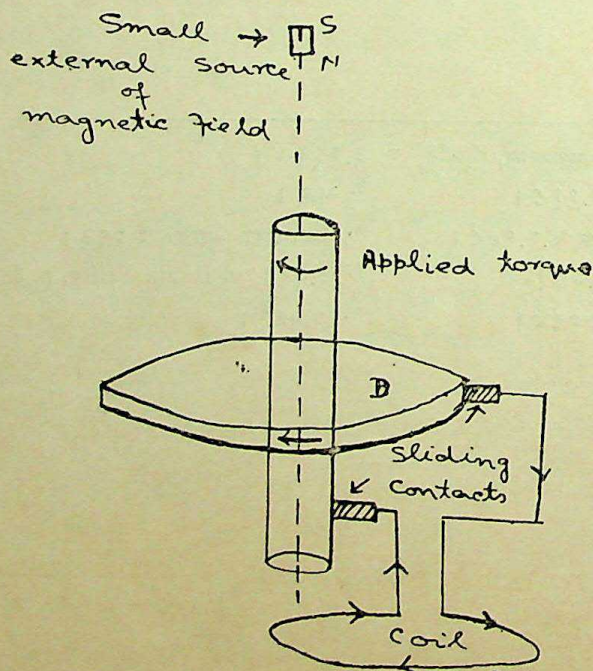
Fig. 1

Suppose that the copper disc, denoted by D, is rotated on an axle, by applying a torque to the axle from an external agency. Further assume that a slight magnetic field, which cuts the disc normally is applied from outside. Then initially, an e.m.f. is developed between the axle and the periphery of the disc. The e.m.f. will give rise to a current around the coil. If the coil is wound in the right sense, the current in the coil will increase the inducing field, which will eventually increase the e.m.f. Thus a very large amplification from a very small existing magnetic field to a pronounced field can be brought in this way.

The stage to which amplification would be established is determined by speed of rotation, radius of the disc and the resistance included in the circuit. For a steady state, the relation,

speed of rotation of disc × radius of disc = Resistance in circuit.

should hold good.

The above device is essentially a mechanism for converting mechanical energy into magnetic energy.

To realise the dynamo action in the case of the Earth's core, we must find the ultimate source of energy from which the kinetic energy of fluid motion is derived.

2. *Application of dynamo theory :*

To visualise the dynamo action in the case of the Earth's Core, we must look to the magneto-hydrodynamic forces that transfer energy for fluid motion and consequently from fluid motion to the magnetic field. To express this in the mathematical form, we write as,

$$N = -(\delta k/\delta t) + Fk + Fp + Fn - D + G \qquad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Here K denotes the total kinetic energy, F_k is the flux of kinetic energy, Fp is the flux of energy due to action of normal pressure forces, Fn is the rate at which tangential mechanical forces transmit energy through the agency of viscosity, D is the rate of viscous dissipation into heat, G is the rate at which gravita-

tional potential energy is released. It will be seen below that the gravitational energy is of great importance for the fluid motion in the core of the Earth.

To look into the effect produced by gravitational field on the core-motion, we will have to consider seperately the effects due to gravitational field of extra-terrestrial origin and that due to earth itself.

Considering first the gravitational fields of extra-terrestrial origin, the mantle suffers acceleration due to four effects :

(1) The bodily tide of the Earth.
(2) A gradual deceleration of the rate of rotation of Earth due to tidal friction in the ocean.
(3) Precession and nutation.
(4) Sudden changes in the rate of Earth's rotation.

(1) *The bodily tides of the Earth :*

The mantle undergoes a radial tidal oscillation due to moon's influence on the rotating Earth. It has been estimated that the amplitude of oscillation at the core-mantle boundary is of the order of 6 cm. Elsasser has shown that it would have little effect on core-motion. The contribution to the energy of the core would be through Fp (Equation 1).

(2) *Tidal-friction :*

The rotation of the mantle is decelerated due to frictional forces accompanying tides in the oceans. Due to this velocity gradients in the core may appear and electric currents may thread the core-mantle boundary. However, Bullard has estimated that very small amount is transmitted to the core as kinetic and magnetic energy in this way.

(3) *Precession and Nutation :*

The rotational axis of the Earth precesses about a 24° cone with a period of 27000 years. Nutation is the fluctuation of smaller amplitude and period superposed on this precession.

It can be shown that if the core fails to precess with the mantle, strong fluid motions might be induced, which would

give rise to much stronger magnetic fields than are observed. Taking this as the basis, Bullard (1949) suggested that precession and nutation do not have appreciable effect on core-motion. However, the problem is not settled because of immense mathematical difficulties and hence the effect of precession cannot be easily ruled out.

(4) *Sudden Changes in rate of Earth's rotation :*

It has been shown, that the earth's rotation rate occasionally changes quite suddenly by minute amounts. These changes are seperated in time by intervals of several decades. The cause of such variation is not yet known.

Bullard has shown that such accelerations of the mantle could not generate significant motion in the core.

Now, let us consider the Earth's own gravitational field, which could generate motions in the core, if there are density inhomogeneities. The density inhomogeneities could be brought about in two ways :

(*a*) Sedimentation and

(*b*) Thermal convection.

(*a*) *Sedimentation :* According to H. C. Urey, the interior of the Earth is not at rest, but that gradual chemical differentiation and slow relative displacement of different constituents is taking place all the time. He postulates that "iron" in the mantle is slowly and continously seeping into the core. This delivers energy to the core in two ways, firstly due to the K. E. of the matter as it enters the core, which it has gained through falling in the mantle, and secondly by gravitational energy release due to displacement of fluid out of the core by the heavier material falling in.

(*b*) *Thermal Convection :* The second process is the thermal convection, which will occur in the core, if the transport of heat radially outwards exceeds the heat transport by thermal conduction alone.

Bullard has treated the mechanism, whereby the thermal energy of the heat source is transformed into magnetic energy

through the agency of fluid motion as a heat engine. He has shown that if the heat supply is 10% more than that required to maintain the flow by conduction (i.e. 10^{11} cal/sec.) along adiabatic gradient, then 2×10^{16} ergs/sec of energy will be easily available for conversion into magnetic energy, which is just the rate at which latter would be depleted by joule heating.

If we do not assume a spherically symmetrical model, the conditions for convection appears to be more favourable. This is due to the fact that fluid motions must arise if surfaces of equal density and of equal gravitational potential do not coincide.

Thus we can say, that core being a good conductor of electricity, and a fluid in which motions can take place i.e. it permits both mechanical motion and flow of electric currents, required for dynamo action, and the interaction of these could generate a self-sustaining magnetic field.

3. *Secular Variation and Westward drift:*

The analysis of secular variation and westward drift of the geomegnetic field reflects fluid motions in the core, and provides additional evidence for the fluidity of the core.

The westward drift of the geomagnetic field has been interpreted to imply that the outer core is rotating more slowly than the mantle. Bullard has attributed the westward drift to the effect of coriolis forces on the motions in the core. He suggested that a differential angular velocity would be set up between the outer and inner core.

On the assumption that the westward drift reflects motions in the Earth's core, the decrease in westward drift in Canada has been interpreted as implying that in this region convective overturn is smaller. If the detailed regional nature of the westward drift could be determined, one might be able to hope to form some idea about the structure of convective motions in the core.

4. *Few related problems :*

The problems that need solution to give a firm footing to the dynamo theory are given below :

(*a*) To find the exact causes of hydrodynamical flow. Although a qualitative explanation has been given but a quantitative estimate is yet to be made of the different causative features.

(*b*) The second major problem is to discover in detail the behaviour of flow in core in space and time.

(*c*) Third is to look into the details of the westward drift of the geomagnetic field, to reveal the nature of motions in the core.

(*d*) Setting up different dynamo models that approximate, much better, for the geomagnetic field of the Earth.

A FEW WORDS ABOUT "QUEST FOR TRUTH"

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Since the publication of the article "Quest for Truth" in the Banaras Hindu University Journal (Vol. VIII (2), March, 1963, pp. 83-105), I have been receiving enquiries, some of which are interesting. For example :—

I. Understanding a thing means an intellectual grasp of it. What is the difficulty about an intellectual grasp of Truth or Reality ? What is precisely meant by the terms Truth or Reality ?

II. Scientific method has done so much to reveal the true nature of things. Why should it be considered as inadequate to reveal the nature of Truth or Reality ?

III. If *all methods* are inadequate, what would be the criteria of approach to the problem of quest for Truth ?

I shall now try to elucidate the above points.

I

The greatest difficulty about an intellectual grasp of Truth or Reality lies in its sublime simplicity as an inherently realized, naturally accomplished fact *in everything under all conditions*. The very attempt of an intellectual appraisal simultaneously creates an apparent artificial severance. All that the intellect can do is to try to re-unite, by spinning its web round and round this apparent point of separation which is its own creation, all the while running breathlessly to a hypothetical goal supposed to be far, far away, though actually the goal is none other than the starting point. It is just like shutting the eyes to think deeply about the phenomenon of vision, cutting off the vision itself at the very first step, and then grope about in the resulting darkness to re-discover the light, all the while keeping the eyes tightly shut.

One with normal eyes can spontaneously see everything clearly, even though completely ignorant of the optical physics and the anatomy and the physiology of vision. And all our laborious studies of the optical physics and the anatomy and the physiology of human vision have not yet revealed the mystery of all the processes involved in vision, but have often brought about an extremely myopic and blurred vision in the learned.

The ignorant and the lazy need not feel important and exalted. It requires a giant intellect to reconnoitre the limits of intellect, and it requires a razor-sharp wisdom to cut through these limits and merge into the *limitless unknown* beyond.

The following represents in a nutshell the problem and its solution :—

The shining sun declares,
'My splendour is all-pervading'.
The dark cave laments,
'Thou art unkind to me'
The sun smiles,—'*Thine own walls shut me out,*
'Open up, and *I am in thee.*'

Reality is this "IS"-ness of Truth within and without. It is not *knowing* this 'IS'-ness (where is the knower ?), it is not *experiencing* this 'IS'-ness (where is the experiencer ?), it is not even *awareness* of this "IS"-ness (where is he that is aware ?), but it is the BEING of this "IS"-ness in its totality.

And this 'being' is neither theoretical nor remote. At every step in our living we are 'being' this "IS"-ness. It is a fact, as mentioned above, that we can see without understanding the processes involved. Physics can lead us only upto the formation of an inverted image on the retina. The subsequent step is "IS"-ness, about which physics is silent and physiology puts forth a mere conjecture. It is a fact that we can hear without reading the chapter on "sound". Physics tells us about the vibrations entering the ear, and physiology about the nerve-endings receiving those vibrations. But how these are transformed into the sweet chimes of a bell is again a matter

of "IS"-ness. Physics, is mute here, and physiology forwards a mere conjecture.

Therefore, we *can be*, and in fact we are this "IS"-ness, this reality, without knowing—(and is there any necessity ?)-the science and philosophy of it. Both science and philosophy perforce have to wait at the outer gate, each getting a partial glimpse only, by peeping through windows marked "Science" and "Philosophy" respectively.

II

We sometimes witness the rather uncommon phenomenon of scientists of worldwide reputation and eminence treading fields not supposed to be their own. To quote only a few examples, mention may be made of Jeans (Physics and Philosophy), Eddington (Physical Nature of the World), and Schrödinger (Mind and Matter). *All* these are obviously NOT manifestations of good scientists turned bad philosophers. They are rather manifestations of a much deeper innate human urge to know and understand what lies beyond the illusive veil of nature. The Scientist and the philosopher,—each has tried in his own way and according to his own capacity, and each has succeeded in proportion to the degree of freeing himself from the conven tional rut of the accepted methodology and the dominant concepts of his time. It would be worth while here to seek for the reasons as to why what ought to have been a deep insight is oftimes but a mere speculation.

For a man of science the measuring foot-rule has been the perceptual knowledge of the external world, and whatever theorizing he does is based on that. But the veil still remains. When new discoveries are made, scientists unhesitatingly revise the scheme of things according to the new light. There are numerous examples of very well-established theories, held in reverence for hundreds of years by the best brains of the times, that had to be discarded, because as science progressed new facts were discovered which were contrary to the previous theories, e.g., the phlogiston theory, and more recently the atomic theory. So, for the scientists the latest ideas are true,

so long as they are not contradicted and replaced by newer and better ones, more in conformity with the last of the latest "observed facts", these latter, of course, being dependent upon the precision of the latest instruments invented and perfected up to date. Hence it is very, very difficult for a scientist to assume that the world of mind and matter may be only a manifestation of a deeper substratum of reality which may be beyond the perception of our senses, even though we may magnify their power a millionfold or more by inventing more and more powerful and precise apparatus. This attitude is the direct outcome of an assumption that it is impossible to experience truth *directly yet without subjectivity*, and therefore to approach the problem in any other way except the "scientifically objective" way means wasting one's time in useless speculations, irrational inferences and utter subjectivism. Yet, for a really impartial scientist, it is not impossible to look beyond this assumption and accept the possibility of knowing truth by direct experience without subjectivity, where he need not depend upon any uncertain speculation, indirect inference or dogmatic convention whatsoever, scientific or philosophical.

III

There is a very striking resemblance in both the scientist and the seeker of ultimate reality in the effort to completely eliminate the 'personal factor',—the scientist to attain the desired objectivity, and the seeker to obtain an undistorted view. So the equation in both the cases ought to be:

"I"-ness *minus* "I"-ness=Zero..................(i)

Yet strangely enough, for the scientist the equation (i) becomes:
"I"-ness *minus* "I"-ness="Eye"-ness. (observing).
And for the seeker the equation (i) becomes:

"I"-ness *minus* "I"-ness="IS"-ness. (Be-ing).

But it must be pointed out here, that for anything to be intelligible at all an almost instantaneous cyclic process of "eye"-ness immediately followed by "is"-ness is essential even in ordinary (? !) processes like seeing, hearing etc. What vitiates that knowledge is the distorting interference of the "I"-ness, which

usurps the role of the judge. If the scientist can envisage that ideal and perfect objectivity entails the elimination of even the observer, the phenomenon of "IS"-ness without "I"-ness—*i.e.*, *direct experience without subjectivity*—would no longer seem strange and alien, and the barrier between the seeker of "scientific" truth and the seeker of "ultimate" truth would no longer remain insurmountable.

It is this free, unconventional and unconditioned approach which is essential if one seriously wants to deal with the problem of the quest for truth. The article "Quest for Truth" presents such an approach, which is independent, rational and intensely practical. It is an approach which considers that 'all assumptions, all postulates, all formalizations, and all axioms are arbitrary.' It is an approach which having found the human intellect within a human frame both an aid and an impediment in the quest for truth,—(*aid*—because it helps in comprehension ; *impediment*— because it sets a limit to all such comprehension as a *typically human comprehension*)—has dared to go beyond all processes of thought. Only those who can venture as much can be travellers in the quest for Truth.

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PERSPECTIVES IN HUMAN BIOLOGY

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Long before the birth of genetics Pope wrote in his Essays on Man that "The proper study of mankind is Man".

Human biology is a vast subject. Its ramifications penetrate into other related sciences, and it is not possible to do full justice to it within the limits of a short discourse. But the present treatment will serve to give the readers some idea of its dimensions.

A correct appreciation and understanding of this subject can only result from a working knowledge of several sciences, e.g., genetics, virology, anthropology, geography, ecology, physiology, biochemistry, medicine, linguistics, phonetics, psychology, parapsychology and demography.

The local varieties of man are spoken of as races, but, when we apply the race-concept to man we land into difficulties, because human family is of such a mixed kind. No matter how we divide the human family into racial groups, we become involved in difficulties of proper scientific definitions. For instance, the genetic basis of colour seems to be different in different groups of negroes, although phenotypically, they may resemble one another. The situation becomes more puzzling when, for instance, Africans and Whites produce hybrids known as mulattoes, who show a gradation in skin colour. The crossing between the Africans and the Whites and other coloured stocks produces hybrids of dark, light intermediate and white shades. It will, therefore, be seen that the prevalent race concept is only an arbitary way of grouping the family of Man into compartments not according to any rational scientific basis but according to the sweet will of the ruling or wealthy classes of the world.

Being the text of a Popular Lecture delivered on 16th Oct., 1962 under the aegis of the Second All-India Congress of Zoology held in Varanasi.

"The attempt to classify mankind into genetically homogenous groups becomes progressively more difficult as we take into account the genes. If we try to derive a concept of race which will be relevant to all characters of man, the attempt is a complete failure. Segregation and recombination has gone so far in most sections of the human population that it is impossible to summarise an individual by any description less complete than a specification of the whole genotype" ( ).

We are told by the historians that four branches of the human family, starting from Central Asia, migrated eastward and westward to people the world. One branch took the south-east course and came to India and the other three went westward and entered Europe. The Nordics, the Mid-European and the Mediterranean stocks belong to the western branch, but we do not know how and where the negroid stock arose. We also have little information about the orign of the Mongoloid and Caucacoid stocks.

The stituation is a little more intriguing than this in India. The Vedic Aryans came to India in pre-historic times and entered into the plains of India through the Hindukush Pass. They first settled down in the Punjab, and, then, moved into the Indo-gangetic plain by stages. In course of time, on account of their intellectual superiority, they established themselves as masters of the land and intermingled with the original inhabitants of this country. After having established themselves in the North, they penetrated into South India also. In the historical period, people from many parts of the world came to India and settled down here, becoming incorporated in its population and enriching the common civilization by their respective contributions.

"Australiods are found today in Andamans,............and Ceylon. They are also found scattered over Peninsular India ....According to Majumdar (1947)", Paleolithic people occupied Peninsular India first and then drifted north to the Schan Valley of the Punjab".

"The proto-Dravidians must have evolved in India as segregates from the Australoid type. This southern element is to be found not only in India, but also as far west as Baluchistan and Southern Arabia (*vide* Coon, 1939).

......"The Indus civilization of the third millenium, typified in Mohenjo-Daro culture, is probably purely Dravidian. After the Indus culture came the Aryan invasion, believed to have originated from Southern Russia, perhaps from a temporary locale near Lake Aral, beginning between 1500 and 1400 B.C. The Bronze Age Aryans brought with them their dairy and cattle culture, which gradually fused with the mainly agricultural culture of pre-Aryan India".

"The ancient Aryans, who were practically patriarchal, met the strongly matriarchal Dravidian people of India. Somewhere in the Punjab, an interminghling of the two peoples resulted in the present hybrid Aryo-Dravidian population of the Indo-Gangetic valley"......

......"The Sudrās, or Dasyüs, who formed the fourth class in Aryan nomenclature were generally the Dravidian people"......The bulk of the population of northern India is Aryo-Dravidian ; Mongoloid types are found in Bengal, Assam, and Bihar ;and Dravidians, proto-Dravidians, and Asio-Australoid form the bulk of the population of Peninsular India.

Phoenicians, Polynesians, Melanicians, Cretians, Ionians, Egyptians, Mongols Tartars, Scythians, Negroes and Moguls came to India as traders or invaders, at different times in its history, stayed for a short or long while even ruling over certain areas of the country, and, often, becoming merged in the land of their adoption. It is contended that the Dravidians were the early inhabitants of this continent and were driven south-ward by the Aryans. The negroes also came to the West Coast of South India some time in our history and have left behind some signs of their presence.

The Nagas, Kols, Bhils, Santhals, Gonds, Vaddas and others represent a very ancient stock of people, who were once very numerous and prosperous in this land and who,

according to some specialists, represent remnants of an ancient stock. In recent times, the Dutch, French, Portuguese and the British made a bid to establish their rule over the land. But while others failed, the British succeeded in staying here for nearly 200 years and have left behind their marks. The fact that deserves to be taken notice of, in this context, is that, in our constitutional make up, there exists, *in all probability*, a combination of many traits and characters of which we have no knowledge. Many streams of blood have met and we can only vaguely guess the "*genes*" that might have mingled to make us what we are. It is no use denying the fact that a great deal of admixture of blood has taken place, at one time or another in our history, and, later on, when the conditions of life turned to normalcy, a kind of social stratification occurred due to political, economic and religious causes. To a geneticist it is plain that social stratification, combined with the erection of social barriers, promulgation of Do's and Don'ts, isolation of one community from another, absence of intermarriages and other barriers tended, in course of time, to produce "*genic-pools*" *of microgroups*, at different levels within our society.

Take for instance, the distribution of the blood groups in India. Unfortunately, a sufficiently detailed analysis of the population has not yet been attempted in this country, but, from the results of blood groupings so far done in the Blood Banks, it seems that groups A and B are more common here than O or AB group. It is said that A group is characteristic of the Europeans and B group of the Eastern Asiatics. The American Indians generally belong to the O group. If both A and B co-exists in Europe or Asia, then these two stocks must have commingled sometime, at some place, in their ancient racial history. Otherwise, how could group B be present in Europe or group A in Asia ? And the presence of the O group in the American Indians, to say the least, is perplexing. Does it mean that, at first, the human stock belonged to the O group, and, later on, groups A and B were evolved, say, by mutation ? If so, it is any body's guess how group O turned into group A ; and again, how the B group came into being.

The evolutionists will lay stress on the effect of the environment; but the mutationists will ascribe the change to genic mutation. Genic mutation is a very attractive term, but none of us can explain satisfactorily the exact way in which it happens or happened in the past. It will, therefore, be seen that the study of the blood groups raises issues of fundamental importance, concerning man's present constitution, heritage and distribution. Homo-logous genes are said to be present in the higher apes.

Developments in this science have also led to the confirmation of the Darwinian theory of the descent of man from apes. The old world monkeys, not included in the Hominoides, show A and B substances not in their blood, but in their tissues and in the body secretions. The Pongeidae show A and B antigens in their blood, as well as in the tissues, like man, but only a few specimens of gorilla have been tested. Chimpanzees belong mostly to group A, some to group O, but no B or AB group has yet been found in them. Orang-utans possess A, B, AB, but no group O. Gibbons are similar; the mountain species belong to group A and the lowland species to group B.

Much has been made of the national and racial differences in respect of the Intelligence Quotient. In my opinion, in making such estimates a number of extraneous considerations have been allowed to colour our judgement in order to prove that the negroes and the coloured races are an inferior stock of human beings. However, some of the genetecists are now prepared to admit that the genetic significance of I.Q. is doubtful.

Every nation that acquires power and wealth begins to regard itself as "Gods own chosen people" invested with the authority to rule over their less fortunate brothern. Unfortunately, in certain European countries, a tendency to enlist the support of geneticists to establish this claim has been in evidence in the past.

The genetic composition of the population could be improved either by lowering the fertility of the carriers of deleterious genes or by raising that of the carriers of favourable ones, the idea being to eliminate the source from which the

undesirable genes can stay in circulation. It is possible to sterilise the individuals in whom the bad genes are in evidence. Dominants can be spotted out easily and dealt with. The sex-linked recessives could also be eliminated, because all the male carriers would show the presence of the gene, but the case is different with the autosome recessives. Only a small proportion of carriers are homozygous to manifest the bad character.

Landsteiner demonstrated in 1900 that the mixing of the red cells of one person with the serum of another person, sometimes resulted in the clumping of the red blood cells. Much work has been done on blood compatibility and the well known A, B, O and AB blood groups are now too well-known. Thousands of individuals were tested especially during the two world wars, and also, in the post-war period, in the so-called blood banks with the result that we now possess a reasonable degree of knowledge of the distribution of the various blood groups atleast in the U. K. and U.S.A. A number of intriguing points have, however, arisen, during the course of such surveys, and they have only been partially answered.

In 1927 when experimental animals were immunized by injecting human blood into them, it was found that there were two more human blood groups systems (MN and P) to be reckoned with. In 1940 the *Rhesus* factor was discovered. After 1940 the Kell system, the Lewis system (1946) the Duffy system (1950) and the Kidd system (1951) of antigens have been reported to occur in the blood of man. At present, nine well-defined human blood groups are known to exist.

A knowledge of the blood groups in man has proved to be a very useful tool in the hands of the medical profession. Such knowledge is also useful for establishing relations in cases of disputed legal parentage (with MN antigens and antibodies).

Ethnic Groups :

On the basis of the blood groups, students of anthropology and sociology have attempted to chart out the distribution

of the various races and of the ethnic groups in the world. It cannot be claimed that their attempts have been fully successful, but we have been able to divide the human family into as many compartments (or groups) as our vanity has impelled us to do.

As new evidence has come to hands, we have been compelled to revise our views. For instance, B type has been reported to be present in Central Asia and the frequency of O type decreases from Europe to Asia.

Wars, pestilence, draught, climatic changes, scarcity of food, geographical changes have often resulted in an admixture of the people, which may have caused chromosomal mutation quite apart from genic mutation in the accepted sense.

When taking the Rhesus, MN and other factors, into account, we find that the inheritance of this or that factor is accidental and uncertain. Human material does not lend itself to experimentation in the laboratories and there is a prejudice against such an attempt being made in any part of the civilized world. Therefore, we are left with the alternative of making statistical surveys and using only indirect methods of computation. All that we can say, at this stage, is that the greater or less frequency of the occurence of a particular gene or group of genes, in a particular population, *may be used as a mark of its raciality*. The concept of race in human population, therefore, becomes very labile, and even fragile. We may say that "races are not distinct individuals or genotypes, but populations which differ in the incidence of some genes or chromosomes in their gene pool". Brothers and sisters often differ and belong to different blood groups. If the parents belong to group O and group AB, then half the children will belong to group A and the other to B, and the parental types will not manifest themselves.

In recent years, some of the political leaders have been dwelling upon the necessity of establishing a casteless society. They have been advocating this idea, especially from the point of view of political stabilty. A Commission was recently

appointed by the Government of India to suggest ways and means for emotionally integrating the people. Several suggestions have been made, but they are not likely to yield as spectacular a result as Rajagopalachari's formula of intermarriages between the northern and the southern people. Not much is to be feared from such a step. The political unity is now fostered by the constitution, the cultural unity is the result of our past history, and what remains to be accomplished, is the ethnic fusion of the people. The isolated genic pools, resulting from restrictive marriages and other barriers will merge into *a grand reservoir of genes*. Some bad result may manifest itself immediately on account of the meeting together of certain recessive characters or lethal alleles, but these will soon be eliminated and good results will follow eventually. Physical and intellectual vigour will also result. The case of the U.S.A. is an instance in point.

In recent years, a great deal of attention has been bestowed on radiation hazard. The hazards of an atomic war have resulted in the creation of a new field of scientific enquiry commonly known as Radiation Biology. Eminent biologists are actively engaged in studying the effect of different kinds of radiations on material ranging from Protozoa to Man. The atomic blasts are undoubtedly polluting the air with the 'fall out'. Man and other living beings have been exposed to solar and cosmic radiations of a certain order from times immemorial. Human habitations exist in Iceland, Greeland, Arctic region as well as in Tibet and the Himalayas. The impact of cosmic radiation on the bodies of animals, inhabiting these parts of the world, may have been inducing certain changes in them unless their bodies have been screened by some natural mechanisms.

At one stage of the earth's history natural forces conspired to produce man, but, from the time of his emergence, he has been trying to gain a mastery over Nature and has been changing the face of the earth. According to William Thomas, 'The history of mankind may be considered as man's own

exploration of the various physical and biological conditions on earth's surface, a result of the elaboration of human needs, capacities, aspirations and values'. Having exploited its resources to the fullest extent, man now finds that the material resources of the land are no longer able to satisfy the hunger of his tribe and to satisfy the ever-growing greed of his nature. Serious attempts are even being made to harness the resources of the sea for the benefit of mankind. Experiments are still in progress aiming at manufacturing sweet water from the sea-water and food from marine products for human consumption. And now having over-peopled this earth with his own kind, whose material wants are not being satisfied with the avaiable natural resources, the craving of man has impelled him to navigate into the Space and to attempt even to land upon the moon. One cannot see the end of this ambition. It is possible that the intelligence of man, which enabled him to make headway so far, may also help him to make further progress in the conquest of Space, but it is also possible that the mad greed of man *may contain within itself the germs of his own destruction.*

Population Problem :

The problem of the evergrowing population is very much in the fore now-a-days. We are told that 'of all the problems confronting man in the mid-twentieth century, none is more grave in the long run than that of man's fertility. It is also said that 'India is the *locus classicus* of the Malthusian dilemma'.

Dr. S. Chandrashekhar writes that 'it took the human species many thousands of years to multiply to a billion (100 crores), but it took only a little more than a century to double that number'. The United Nations' estimate is that, at this rate of increase, the world might have 6.2 billion people by 2000 A.D.

India's population :

Between 1871 and 1921 (50 years), our population increased from 214 to 248 million (2480 lacs=24 crores), but, between 1921 and 1951, we increased by 100 millions (1000 lacs=

10 crores) ; and between 1951 and 1961, we again added another 77 millions (770 lacs=7.7 crores).

India ranks second in respect of world population. The factors responsible for such an explosive population growth are (a) high birth rate, (b) early marriage, (c) absence of family planning, (d) recent decline in death rate, (e) improved hygienic conditions of life (f) medical care, (g) new antibiotics, (h) maternity and child welfare measures.

Apart from the political or economic problems posed by such an increase in population, there are qualitative and quantitative problems of a biological nature that have to be taken care of in every society by the Government of a civilized country. Really speaking, it is not possible to speak of one and to be silent about the other. For example, 'when the young and the old age groups are disproportionately large, the burden of supporting these two unproductive ends of the age scale falls on the small percentage of those that are gainfully employed.'

Similarly, the sex composition or sex-ratio of a population can also pose a problem. There may be too many males or too many females in relation to the opposite sex.

Qualitative improvement of the population, according to the rules of eugenics, has not succeeded any where in spite of all efforts, because human society does not lend itself to scientific treatment or permit the scientists to shape the society according to their fanciful ideas. But measures of negative eugenics may find a ready response in human society. For instance, probably every body would agree to the reduction of the incidence of blindness, deafness, imbecility and all types of mental disorders.

The quantitative aspect of population is also important. For instance, without a reasonable size of the population, there cannot be maximum production, high standard of living, political stability, economic security and the leisure for the pursuit of cultural values.

Stern writes that 'from the point of view of the population there might be more cause for concern if there be an increase of 0.4 per cent in abnormal births in a country with an annual birth rate of 3,000,000 (30 lacs), which would mean an additional 12,000 abnormal individuals per year in the first generation and further abnormalities due to recessive genes in the later generations'.

It is not possible to deal with the dynamical aspects of human population within the compass of this article, but we will do well to remember that population dynamics is intimately bound up with the biology of the human race.

Length of generations, fecundity, fertility, mortality, sexual maturity, sex-ratio, sex behaviour, abnormal sex-psychology *et cetera* are nothing but long and haunting shadows of the biology of Man.

A. G. Garrod's book which appeared in 1909 was an eye-opener. W. B. Canon's contributions, between the years 1914-29, on the physiological basis ofem otions, made a profound impact upon medicine. E. A. Cockayne's publication in 1933 did much to bring into a common fold the clinicians, physiologists and the geneticists. Since then, Crew, Ford and several American authors have penned books on human genetics. Haldane in 1941 and Sorby in 1953 showed that many of the manifestations of diseases in man are due to the action of *genes* (or inheritance). A tribute is also due to R. C. Goldschmidt who gave a new slant to genetics by the publication of his book-*The Physioloigcal Basic of Sex-Determination*-in 1911 (1912). Another book (Physiological Genetics. published by McGraw Hill in 1938 by the same author is a mine of information in which the subtle ways in which many of the genes work is vividly narrated. Grunenberg's in his book "*Animal Genetics and Medicine*", London, 1947, and H. Harris in "*An Introduction to Human Biochemical Genetics*", 1953, brought out vividly the relation between Genetics and Biochemistry.

This was quickly followed in 1954 by Haldane's "*The Biochemistry of Genetics*" which formed an excellent supplement

to Harris' publication and created unprecedented interest in the subject. Medical experts have not been slow in recognising the strong influence of heredity in the causation and manifestation of certain diseases. The literature is vast and varied, and a certin degree of familiarity with human physiology is necessary for a full appreciation of their efforts. But a mention of R. H. Thomson and E. J. King's book entitled '*Biochemical Disorders in Human Diseases*' London, 1959, seems necessary, because it is a masterly survey of the subject that I have come across.

In advanced treatises now-a-days one finds references to disordered biochemistry, abnormalities of enzyme action, electrolytic balance of the body cells and imbalance of extracellular fluids. All that I will attempt to do is to reproduce here some extracts from published works to show that at least there is now greater *awareness* of the part played by genetics in our lives. It is a triumph on the part of genetics to have compelled attention from the medical experts. The biometricians, geneticists, biochemists and physiologists have given an umbrella coverage to the diseases in the last two decades, resulting in the discovery of satisfactory explanations in many cases and the elucidation of new points of view.

Peptic Ulceration :

Peptic ulcer is well-known, surgical and medical treatments are often prescribed, but the predisposing causes of it are still unknown. Prof. Black writes "At present it can only be said that the cause of peptic ulceration has still to be found, if indeed there is a single cause for a syndrome in which social, psychological, genetic and dietetic factors can all be shown to be concerned". Prof. Black also writes that 'this variety of approach,...............suggests that the *unique cure* is still as far to seek as is the *unique cause*'.

Jaundice :

Many of us know what jaundice is and are also familiar with hepatic cirrhosis and necrosis. Noel F. Maclagen writes

that pre-hepatic haemolytic jaundice 'may be due to over-production of bilirubin from excessive haemolysis due to either *abnormalities in the red cell* or to haemolysis of the normal cells by *abnormal antibodies* or by *extraneous haemolytic substances*'. Anyone familiar with modern genetics will know that abnormalities in the red cells and abnormal antibodies both are of genetic origin.

Anaemia :

Diseases of the blood and anaemia are of common occurence in human beings. The red blood cell has four main components-stroma, electrolytes, enzyme and haemoglobin'. *Genetical abnormalities in these components, sometimes at a molecular level, are the cause of the diseases*'.

Hereditary *sphaerocytosis* is due to an abnormality of the red cell, which is probably inherited as a Mendelian dominant.

Sheila Callender and O'Brien say that 'the discovery of sickle-cell anaemia presented to medicine the concept of molecular disease. This concept implies that diseases may result from a genetically determined fault in protein synthesis'. The same authors write that 'development of haemtology in the last three decades has been influenced by coincidental growth in concepts and techniques of biochemistry and physiology'.

Electrolytic Imbalance :

Sixty-one per cent of the body weight is water ; therefore, the importance of the fluid balance in the body should be obvious. Claude Bernard said that 'the extracellular fluid provided an internal environment of virtual constancy in which the tissue cells might safely graze'. Macallum (1926) thinks that 'the salinity of the extracellular fluid is a vestige of the marine environment in which cellular life developed'. The osmotic activity of electrolytes (which will depend on the number of particles in a unit volume) and the electrostatic activity (which depends on the number of charged ions) matter in the maintenance of health, and an imbalance leads to serious metabolic

disturbances. Black has aptly remarked that "the general function of the electrolytes is to provide an apt intracellular milieu for enzymic action". A. Leaf and L. H. Newburgh have dealt with the significance of fluids in clinical medicine, while K. E. Roberts and P. Vanammee have discussed the electrolyte changes in surgery. W. D. Snively and M. J. Sweeney have discussed Fluid Balance in a Handbook for practitioners.

Hypertension :

George Pickering and W. S. Peart believe that hypertension is inherited in much the same way as height.

Congenital Adrenal Hyperplasia :

Adrenals of patients suffering from this disease, when stimulated with exogenous ACTH, react differently from normal persons. There is no increase in urinary or plasma corticoids. Such adrenals have difficulty in secreting the normal adrenal steroid hydrocortisone, but can secrete very readily a steroid or steroids that are *precursors* of the urinary 17-Ketosteroids and pregnanediol complex.

Diabetes Mellitus and Hypoglycaemia :

Peter H. Forshan and G. E. Mortimore think that in the majority of cases of spontaneous diabetes, heredity plays an important part. The genetic factor is a Menedelian recessive but may also be a sex-linked gene.

Abnormalities of Amino-acid Metabolism :

In Amino-aciduria, free amino-acids are found in the urine in larger amounts than in normal cases.

Cystineuria :

Cystineuria is genetically determined. Cystine and lysine are present in the urine in excess and sometimes argenine and ornithine are also present. The occurrence is typical of a mendelian recessive character. Cystineuria occurs in homozygous individuals, the heterozygotes escape detection.

Fanconi's syndrome :

The symptoms are rickets, chronic acidosis, polyurea, renal-glycosuria, hypophosphatenia and marked *amino-aciduria* and electrolytic disturbance. Increased excretion of certain *amino acids occurs* and the renal tubules fail to reabsorb them. The syndrome is inherited as a *typical Mendelian recessive character.*

Gout :

Gout is linked with uric acid metabolism. Primary gout occurs in individuals with hyper-uricaemia, a hereditary condition determined by a dominant autosomal gene transmitted by both the male and the female.

Von Gierke's disease (Glocogen-storage disease) :

Excessive storage of glycogen in one or more organs of the body happens in this disease. It is due to a hereditary defect in the action of enzymes acting on carbohydrates, and the pattern is that of a *Mendelian recessive.*

Inheritance of Hand-shape and Facial features :

It is generally held that the facial expression is heritable and studies by Davenport and others have shown that the shape of the skull and of the face, and even the facial expressions, are determined by hereditary factors.

Size and shape of the Ear :

The size and shape of the ear is probably determined by a number of genes, while a single pair of gene is involved in the condition of adherence or freedom of the lobule of the ear. *The adherent ear-lobe is said to be recessive, possibly sexlinked.* One comes across several kinds of deformities in the form of the ear.

Inheritance of skin colour in Man :

The skin colour is the result of the action of multiple genes and, therefore, in human society one sees a gradation of colour from white to dark with intergrades of different hues.

Albinism :

Albinism in man is characterized by the absence of colour in the hair, skin and eye. Albinism is due to the absence of pigment which, in turn, is due to the action of more than one gene. According to Davenport and Gates, 2 or 3 pairs of additional genes are concerned in the production of the graded colour of the skin.

Hair character in Man :

Dark, red, gold and grey hair, frontal blaze, straight, curly, very curly hair and even baldness are conditions well-known to us.

Inheritance of the Eye Colour :

The genes determining the eye colour are independent of the colour of the hair. The colour of the iris depends on two fold pigmentation. The back of the iris has a double layer of deeply coloured cells to exclude light from the interior of the eye. The front of the iris may or may not be pigmented. When unpigmented, in the anterior layers, the eye is light or dark blue in colour, depending on the colour of the posterior layer. Depending on the pigmentation of the anterior layers, eyes are brown, light brown, green or grey.

Variations of eye colour, therefore, depend on at least two genes and possibly on a factor complex of two pairs of genes with the involvement of some pattern factor.

Inheritance of Abnormalities of Vision :

Various types of colour blindness are known. Total colour-blindness is very rare. The four kinds of colour blindness are due to *recessive genes* carried in definite loci of sex chromosomes. Genes for red, green, blue and yellow are located in the non-homologous position of the X-chromosome. These genes are X-linked and are transmitted from an afflicted man to his daughter who is generally normal, but the grandsons possess the defect. The total colour blindness is conditioned by a recessive gene at a locus in the homologous part of the X

and Y chromosome. Total colour blindness may be inherited through both the parents :

Normal vision		*Colour blind*
CB Cb		cb cb
	Gametes	
CB, cb		cb, cb
normal vision in CBcb (Female)		vision *colour blind* in cb cb (Male.)

'Allergy is a condition of hypersensitiveness, which is now recognised as taking an extraordinary variety of forms' writes Gates, 'One of the commonest manifestations of allergy is hay fever'. 'It is estimated that in the U.S.A. there are one to two million sufferers from hay fever and in Germany half a million'. Sensitiveness to particular foods is still more common and it has been estimated that in Central Europe. over 10 per cent of the people have some form of food allergy'.

Wiener, Zieve and Fries (1936) believed that allergy was transmitted by a pair of alleles, Hh, of which h determines the allergic condition. Individuals, who are hh, are allergic before puberty ; Hh individuals are normal transmitters, or develop the disease only after puberty. A normal person may then be Hh or HH, but the Hh will be transmitters and the allergic ones will be hh.

Polymastia or multiple breasts is a condition frequently met with. This shows that a male can transmit the character to his male and female issues, which means that the genes concerned are X and Y borne.

Hypospadias :

This condition is also inherited. The opening may extend up to the scrotum. It is a codition transmitted through normal transmitter females heterozygous for this factor as well as through normal but affected males. It is sex-limited recessive character produced by an X-chromosome, heterozygous females transmitting the condition to half their sons.

(*a*)

Male		Female	
XY		XX^h	
(Normal)		(Transmitter)	
XX^h,	XX	XY	X^h
Transmitter female	Normal female	Normal male	Affected male

(*b*)

X^hY		XX^h	
Affected male		Transmitter female	
X^hX^h	XX^h	XY	X^hY
Transmitter female	Transmitter female	Normal male	Affected male

(*c*)

X^hY		XX	
X^hX	X^hX	XY	XY
25%	25%	25%	25%

(*d*)

... X^hY		XX^h	
X^hX	X^hX^h	XY	X^hY
Transmitter female	Transmitter female	Normal male	Affected male

Sex-ratio :

The sex-ratio of 1 :1 is most likely to be disturbed if some how an excess of active Y over X sperms happens to be present. Tschermak has developed an elaborate scheme by which the alterations in the sex-ratio of 1 : 1 may be explained. He assumes that there are three catalytic sub-factors A, B and C with graduated valence which strengthen the XY or XX disposition. Thus every homozygote which has *no* A, B or C will be XX aa bb cc while others will be XX Aa bb cc *or* XX Aa Bb cc *or* XX Aa BbCc or other variants.

In a book entitled (1956) '*Man's Role in changing the Face of the Earth*', edited by William L. Thomas, 70 or 72

authors of various disciplines, have co-operated to show how human effort, during the course of the years following his evolution, has increasingly conquered and subjugated the vast resources of this planet and how by degrees, through ceaseless endeavor, the secrets have been wrested from Nature and used for the advancement of man's interest. As Paul Fejos has remarked 'Man's evolutionary dominance seems assured; only he himself can threaten it'.

The net result of his sustained efforts has been 'to change his physico-biological environment on the earth' and now, with the advent of space flights and sojourn to the moon, a new era is being ushered in. The attempt that is being made to land on the moon may be for good or evil. But there is no gainsaying the fact that the germs of man's destruction lie hidden in man himself. The animal passions and prejudices, that are a part of his animal origin, may spur him into insane actions, when by just pressing a button the whole of civilization may be reduced to ashes.

No apology is needed to emphasise the importanc of biological factors as causing mental defects in man. Unfortunately, mental defects and maladjustments are becoming more common in this country now as the tempo of life is increasing. It is said that one of the evil effects of industrialisation is urbanization with which such ills are associated. The sound economy and sociology of the rural domestic life, when once destroyed, can never be re-established. Urbanization is responsible for destroying the old values without forging good substitutes for them. The result is the production of tensions against which one struggles for a time, and then, succumbs. The Government of India has recently directed the State Governments to establish, on a regional basis, mental hospitals in India, one or two in each State, which means that the need for the existence of many more mental institutions is being keenly felt. In England, the first large scale attempt to count the total number of mentally defective persons was undertaken in 1904 by the British Royal Commission. As a consequence of this

survey, the British Mental Deficiency Act was passed in 1913. Soon afterwards, this was amended in 1927. As a result of the surveys made, nearly 4.5 per thousand of the population of England and Wales were found to be mentally abnormal. A second survey of the incidence of mental defects in England and Wales was carried out in 1929, when 8.5 per thousand of the people were found to be afflicted with mental illness. One of the startling results contained in the Wood Report of 1929 was that the incidence of mental defect was greater in the age group 10 to 19 years than in later years.

The Society has much to fear from such afflicted persons because they are, after all, a burden on it. In a Welfare State, the Govenment is ultimately responsible for the well-being of the defective persons and cripples. Widows' rescue homes, orphanages and prisons are already a charge on the revenues of the Government and the mentally defective persons are going to be an additional burden on the State.

The analysis of mental defects is by no means so simple as was thought of at first. The causes of mental defects are many. Rare recessive genes, sex-linked genes, anti-natal and post-natal environment and, lastly, gene mutation are said to be the *probable* causes of mental defects. Add to this, the predisposing causes arising out of social maladjustments or domestic unhappiness, anxiety and tension. There are many kinds of rare dominant and recessive defects whose family history has been worked out by the geneticists, but we do not possess any cure for the afflictions. If the pedigrees of some of these diseases are scrutinized, it will be found that, in the first instance, the society had tolerated their prsence, and reproduction was allowed to take place in affected families, whereby the continuity of the disease was assured. It is true that neither socially nor legally can we prevent such parents from breeding. And therefore we find that pools of affected or defective genes exist in every society. We will not probe into the relationship existing between mental defects and incidence of crimes or juvenile delinquency, because, in many cases, it is difficult to

establish the link between them. Social circumstances are also known to have been responsible for driving away many a teenager to become 'wild boys'. Although institutionalised treatment is now provided in many countries, it must be confessed that no satisfactory system of treatment yet exists. What is being attempted is to rehabilitate individuals by providing them with education, training, recreational diversions and brain washing. A radical cure for many of the mental defects does not really exist, although attempts have been made to test the efficacy of certain drugs and curative methods.

It is said that undesirable people who are mentally defective ought not to bear children. Segregation, prevention of marriage and of illicit connections, sterilization, contraception, abortion *et cetera* have been advocated, from time to time, but, in a *free* society, these measures, for one reason or another, are difficult of enforcement.

Compulsory sterilization has been advocated by many important persons, but Penrose says that 'the moral issue of who has the right to decide whether or not some one else is or is not fit to have children is far from being settled'.

It has sometimes been suggested that diseased and mentally defective persons-idiots and imbeciles-may be put to death by legal sanction, and some kind of painless method of destruction be evolved to satisfy human conscience. But Penrose says that 'the object of medical science in civilized communities is to keep persons alive', and Kanner (1942) pleads that 'these low grade citizens are not responsible for their own condition. They can be happy and they can stimulate '*human feeling* and *parental love*. Judged by all canons of a civilized society, they have a right to demand care and comfort'. Penrose ends his book on a soft note pleading for charity and toleration. Has not an Urdu poet said ?

"Khuda rahm karta nahin us bashar par,
Na ho dard ki chot jiske jigar par ;
Karo meharbani tum ahle zamin par,
Khuda meharban hoga arshe barin par."

Penrose has recently published a thoughtful book on mental ill health in man and C. D. Darlington has discussed the genetic components of language. The latter author has even dealt with the *Biological Basis of Freedom* and Haldane has commented on the relation of *Heredity with Politics*. It will thus be seen how far the tentacles of heredity extend in the sphere of human existence and man is not such a free agent as he believes himself to be.

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VICE-CHANCELLORS WHOM I HAVE KNOWN

IV. PANDIT AMARNATH JHA

A. B. MISRA

From the Central Drug Research Institute, Lucknow

"Deplored by those in early days allied,
And unremembered by the world beside".

—*Byron.*

Pandit Jha was born in a home of learning. His father Dr. Ganga Nath Jha, was a well-known scholar and a Sanskritist. From his 'dad', he inherited and acquired the foundation of Sanskrit and the shine of Hindu culture, and from his SCHOOLS a love for English literature. The result was a happy blending of East and West in him.

Amarnath Jha showed signs of brilliance from an early age and was destined to make a mark in life. At the Muir Central College, he came under the influence of Prof. S. G. Dunn, who soon grew fond of his pupil. He often acted as a lecturer in leave vacancies, even in *status pupillari*, and thus acquired a plume in his cap. Later on, he became a permanent member of the staff of his college and, thus, began his career in the Allahabad University.

By his ready wits, general *bon hommie*, liberalism and samaritanism, he rose to the top of the hierarchy of University life. The students adored him, the staff liked him, while others humoured him and let him grow in stature, because they felt the impact of his dynamism. In a short time, he became the focal point of University life. Had he liked, he could have have said : 'Ich bin der Universitat".

When Dr. Ganga Nath Jha became the Vice-Chancellor of the Allahabad University, he became the conscience keeper of the University and his importance in the University acquired a new dimension. Dr. Ganga Nath Jha was hardly the man to brook any interference from his 'kid', whom he could still treat with a rod and a rebuke, but the 'wily youngster' played many

a deft game, keeping himself beyond the reach of his father's rod. In due course, of time, he became the Vice-Chancellor of his erstwhile *Alma mater*, an office for which he had earned for long.

As Vice-Chancellor of the Allahabad University he did remarkably well because he had his fingers on all the key points of the University. After vacating this office, he was made the Chairman of the Public Service Commission (U.P.), an office which he did not cherish much, because he was essentially a teacher and pined for the cloistered retreat of a seminary.

In 1949, he was pursuaded by the U.P. Government and certain private agencies to assume the Vice-Chancellorship of the Banaras Hindu University, where the political climate had worsened and topsy-turvidum prevailled. He felt the call and responded to it, because he thought that he could, circumstances permitting, arrest the rot that had set in this University. But his hopes proved to be dupes, because he was kept confined in the 'ivory tower' of the Vice-Chancellor's Lodge in splendid isolation, free from work, worries and responsibilities'. He soon grew restive and realised that he was not wanted in the B.H.U. The invitation extended to him to become the Vice-Chancellor of the Hindu University was, in fact, a well-laid trap into which he fell unawaringly. It was, at best, an *interim* measure designed to smoke-screen the secret ambition of an aspirant to the *gaddi.*

And so his stay in the B.H.U. was short, uneventful and featureless. He left the University a wiser but a sadder man.

A little while afterwards, he was offered the Chairmanship of the Public Services Commission in Bihar, with headquarters in Patna. It was some satisfaction to him to have been called upon to serve in his native province.

His career through life was such that he could have said :

"Through few, but deeply chequered years,
What moments have been mine.
Now half obscured by clouds of tears,
Now bright in rays divine".

As one surveys his life, one feels that there was a vein of sadness in his existence. It may have been due to several causes, foremost among which was, perhaps, the absence of domestic life. He tried to laugh out his ills and sorrows, and, like a surf rider, swim through life on the crest of the waves, but, even a surf rider cannot escape being thrown occasionally into the trough.

I met him two or three times in Patna and noticed him none-too-well, but he refused to believe that he was unwell. The last time that I met him, I found him pale and wan. At about 5, O'clock in the evening, I stood in the porch of his house, as he drove in his car back from the office. Alighting from the car, he flung himself on the inner Verandah of the house on a *chaise-long*, and began conversing with me over a cup of tea.

I found him tired and weak, and so took leave of him wishing him "auf wiedersehen", scarcely realising that it was my last meeting with him. Nearly fifteen days afterwards, I was stunned to read in the newspapers that he had forsaken his mortal frame.

"*Sic jacit gloria mundi*"

Dr. Jha tried to live an active and mirthful life in order to drive away depressive thoughts, but were he granted another lease of life to live, I am sure, he would say :

"I've liv'd as many other men live,
And yet, I think, with more enjoyment ;
For could I live through my days again,
I'd pass them in the same employment".

—*Byron.*

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THE EFFORT TO DEVELOP COMMUNITY

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After twelve years of the working of the directed programme of developing the Indian rural community, it is no wonder to find a vast amount of literature written on the form of discribing the goals and objectives, achievements and failures, analysis and evaluation of the programme. There are eminent scholars and organizations both at home and abroad who have analysed the programme and either passed a verdict of total failure, or all praise for the programme, taking for granted that there is everything alright regarding the basic postulates underlying the programme and it is the best way of developing the Indian rural society. The C.D.P. makes certain suppositions that are sociologically unintelligent and this accounts for many of the failures evidenced today. These suppositions are that there is a sufficient degree of unity and homogenity in the Indian rural social structure ; that the different groups, classes and castes have sufficiently like and common interests to bind them together and gear them towards a common realization of aims and objectives ; that the state is a perfect agency of administering this programme of directed change social and economic ; and the people will give their co-operation jointly and whole heartedly because it caters to their joint needs and common interests. Even the physical structure of rural aggregates differ from one part to another characterized by different social structures, thus demanding different approach of planned development for different Parts.

These assumptions completely overlook the reality of the Indian village—faction divided, caste divided, and class divided. There is nothing to shun away from this reality of the Indian scene. It is the outcome of the normal social process of the Indian social organization which have to be taken into account, rather than shut as off ugly secrets about

which there is a hushed silence or open condemnation. It would be sociologically unintelligent to ignore the existence of these social facts and undermine their importance, because they just do not fit in the idealists image of an utopian society. The lack of sociological insight in the underlying assumption in the C.D.P. have prevented the planners from treating the objective situation in India with sufficient emphasis. No consideration is given to the study of the rural India to see carefully the patterns of social organization and the value orientation of the people before introducing a programme which aims at a complete transformation of the way the people have been living and the way they have been making their living. It was not given any thought as to what possible barriers may be put forward to the implementation of the programme, which people neither consider as their own, nor for their exclusive benefit. The people by and large still consider the C.D.P. as a government undertaking in which they have no stake. This statement is made on the basis of observations made by the writer in a single village, so they are not in the form of generalization although it cnoincides with a no. of studies made elsewhere. The C.D.P.'s success lies not in the co-operation and the participation of the people in the programme but in mobilizing the existing attitudes and motivation of the people in such a manner that they do not feel deliberate attack intended to shatter their traditional mode of life. It would not help to indulge in wishful thinking that if the people shed their old beliefs and superstition and group affiliations, if they make success their way of life, and if the official machinery is effecient and honest, if there is effort on the part of the people to work harder and selflessly, their shall be complete realization of the aims of the C.D.P., what is needed is the recognition of the fact that instead of indulging in such wishful thinking, it may be taken as a normal state of affairs in the Indian rural life and thus proceed to introduce changes which will be rightly propertioned and acceptable to the people. This is possible only if those who prepare the programme are deeply intimated regarding the life of the Indian village. This is not the case

as there is an almost complete isolation of the intellectual from the area of operation. Thus it is not possible for him to visualise what possible difficulties may arise in the execution stage, that being the reason why there is a "complete disregard of the composition of Indian social structure, the changes which are developing there as a matter of course not due to C.D.P. alone but due to various other factors. The third plan makes a scant mention of the "numerous inherent conflicts and barriers" to progress but does not enumerate them nor considers them seriously as an essential feature to be taken into account in any programme of community development. The lack of objective study of the Indian village and absence of sociologically aimed personnel who would be engaged in continuous and scientific investigation was the first gross mistake which is responsible for a rather dissappointing results of the C.D.P. incurred at too heavy a cost.

The Community Development Project broadly speaking has two great reasons, science and people. (1) Scienffic knowledge for the increased productivity and their better living standards (2) utilization of people, their ideas, their manpower, their capacity of working together to achieve valued goals.

The C.D.P. Programme in India aims at bringing scientific knowledge to the doorsteps of the villager. The governmental agency is there only to provide incentive, to make people achieve a change-over to scientific way of living in an easy way. This doesnot imply that there should be any contribution or participation, of the people in the programme as is most often assumed. It means that what is to be assessed is the government's participation and cooperation in People's participation in their self development. This is not the case. The programme in the coverage of all its aspect in the social and economic spheres, simply means to the official mechinery, the maximum utilization of the funds allocated on a particular aspect of the programme. The people never voice their needs, it is the official which points out the various programmes of action which they must think are useful for him, not always providing

the technical skill, raw material and finances to achieve the desired results. There is the least opportunity to let them feel that the programme is theirs. For a start it was not only admisable but even necessary that the C.D.P. was to be launched by an external agent-in our case-the state, but after 12 years of its working there are no signs of it being developing into a programme or of self generating development programme with people at the helm of affairs. There is however, the opportunity given to make them aware that there are new ways by which they may shift their reliance on tradition to science and technology yet the means are inadequate for the majority. The only benefiting minority is the already well to do class of cultivators. Thus the C.D.P. at present in its very nature gives greater opportunity of access to scientific knowledge to those who are already in a previledged position. There is ample evidence of this fact in our country side to day. Sometimes the type of technical knowledge available is not suitable to the local condition, but still it is thrust upon the people resulting in devastating effects on the people who can not afford to indulge in experimentation for the love of it.

The resource inherent in the human potential has a curious quality of enhancing itself in a short time provided there is sufficient stimulus to arouse it. This is evidenced in times of foreign attacks, social upheavals and revolutions. The unity and enthusiasm as which characterized the Indian people before Independence is no longer forceful and there have to be different incentive for enthusiasm now. It is natural to expect frustration from the people as they hoped for a prosperous independent India and the C.D.P. gives many promises, shows many dreams which if realized would bring the desired equality and prosperity but does not meet the greater cravings expressed by the people by providing opportunities to them for cultivating the potential in them to realize their wishes.

It would be socially harmful if the people are made aware of the better ways than the ones to which they are accustomed,

without making them strong enough to shoulder the self responsibility and bold enough to plan for themselves. Otherwise people will be dependent (and they are at present totally dependent) on the initiative of the official machinery in the fulfillment of every project. There is a danger which is becoming evident today that the official machinery very often fails in continuing to give this total guidance and assistance endlessly.

A study made in an east U.P. village by the writer revealed that although the programme was launched there even before the official launching of C.D.P. in 1952 and all the aspects of development fully initiated in the beginning years, almost all activity has slackened down to negligible point because that block has returned to normal stage when it is expected that the community will-self generate itself. A closer look makes it clear that whatever projects were undertaken in the first years of C.D.P., lie now in disrepair and the people wait for the government body to come and take the initiative in their repair because they think that they all (Projects) belong to the state. There is no evidence to show that they treat the programme as their own. Thus the C.D.P. fails in its basic aims, that is of cultivating the human potential as it has not given sufficient sociological insight to the problem of discovering frontiers on which the people could be more easily drawn into the programme with a real feeling about the programme as an instrument for their self development ; an agent for directing their social life in a progressive, permanent desirable and multi—directional way.

It has been observed that the peasant's most precious and vested interest is in his land and that India's problem no.1 is the food problem so the programme had to be initiated keeping in view, the agricultural improvement as a formost requirement. Since the daily round of the peasants life & his very outlook towards life depends on his occupation, any changes accepted on this front will be helpful to change harmful social values and customs. It is only natural to expect normal forces like unknown results of initial risk, conservatism of the older

generation, fear of the new reverence for the past along with the vested interests, are the factors which opposed change. But at the same time borrowing a term from Spinoza, the quality of "Social conatus" or persistance is a characteristic of innovations. Thus new changes inevitably over-come the resistance of the traditional forms which are tenacious.

The Peasant's view of good life is one of sufficient food to keep his belly full and his house full of a large brood of children. Any change offered to bring greater prosperity is always welcome and the peasant is shrewed enough to see what will benefit him directly in the large no. of innovation offered.

The distrust and suspicion which characterizes the Indian Peasant today, in his attitude towards the governmental agency, can be understood from the fact that a prolonged period of foriegn domination with its exacting demand on rural society, the one way process of taking away the produce of the land, an atmosphere of opperssion and terror, still casts its shadow on the rural scene.

Nevertheless some changes are observed in the Indian Peasantry today, changes which are the by-product of the community development programme. Firstly there is an overall feeling of dissatisfaction and frustration among the people and they are aware of the C.D.P. is for them but at the same time cannot understand why they can not enjoy the benefits in full measure. On the part of the individual we can say that there is need for Education, in the broadest sense, which will equip him for accepting new and scientific way of life. This can be achieved only by a time covering at least two generations. From the point of view of the agency sponsoring the programme there is a need for greater assistance and less direction, willingness to hand over power and resources, and help to make the village a healthy and strong unit for undertaking responsibility for self development.

Secondly, an important minority i.e. of scheduled castes, is experiencing of a new kind of hope because of new

aspirations and previledges offered. The result is a refusal to undertake the age-long traditional and so called unclean occupations. But at the same time there is meagre provision to absorb this newly released human power into cottage industry. Whereas there is a multifarious programme for the agriculturists in the village, the artisan, the labourer and other low status people are completely ignored. Thus the resulting despair of the scheduled castes there is an effort on the part of these castes, infact all castes to raise their status.

Further, it may not be asserted that there is a manifest transformation in the Indian social structure but we do find a gradual shift from traditional to more progressive order.

It needs a thorough analysis to see why the effort at developing the Indian community has met with so little success though at the same time, it should also be kept in mind that since it is only a method and a procedure of inducing change and cannot be blamed for its failure to deliver the goods, as the fruits can be reaped only by long patience and perseverence taking into account the forces that confront change with resistence and the weeker frontiers where tradition may be attacked and new made the order of the day. This will also need an effort to understand the social implication of the planned development. There is no alternative to directed social change to-day and it is a pre-condition the economic social and technological change though economic frontier has to be tackled first to make peasantry a source of change, once the initial barriers are broken a new vista will open. It is too obvious now that the old order is not what it used to be on the Indian countryside and it is at this point that direction is needed not by exploiting the peasant's grievances and frustration by political interests, but by efford-ing opportunities to those who want in items of increased initiative and ability to utilize the facilities brought at their door-steps, by offering occupation to reduce overcrowding on land and finally by preparing themselves for the transformation—social and economic, through their own efforts with the Govt. agency only in the form of an aiding body, ready at hand for consultation, guidance and help.

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With so comprehensive a scheme as that of community in India, it is very natural that one is at a loss to evaluate it in totality. But as far as it is an effort towards making it a potent vehicle of social change, it may be said that it has succeded in making the people dissatisfied with the way they are leading their social life, now it is one step ahead to make them exert themselves to final alternatives. This will need a honest extension education in its widest sence, easy flow of opportunities, without delay, an effort in building faith in people themselves—their capacities. The Panchayati Raj with all these promises is yet to pay premiums.

CHANGES IN FACTORY EMPLOYMENT DURING THE PLANS IN INDIA

DR. AYODHYA SINGH
Department of Economics

The existing data are inadequate for building up a sufficiently detailed picture of the state of employment for the country as a whole and in its regional, urban and rural aspects. Even in the more advanced countries where the bulk of employment consists of wage or salary-earners it is difficult to have complete data on the quantum of employment. In an under-developed country like India where the greater portion of employment takes the form of self-employment rather than wage-labour, mainly in unorganised sectors, it becomes all the more difficult to get a complete picture of employment changes in the economy. There is a tendency, especially among the self-employed, to share work between members of the family or the group. Where the available work opportunities are spread too thinly, even to provide tolerable means of livelihood a part of the population migrates in search of paid employment. It is in relation to this section of the population that the term 'unemployed' can be used with some exactness. For the rest one can only speak of under-employment for varying periods. For instance, in the rural areas, both unemployment and under-employment exist side by side; the distinction between them is by no means sharp. In villages unemployment ordinarily takes the form of under-employment. Or, again, in retail trade and other commercial establishments (even in urban areas) average wage-employment is less than one per establishment. It really means that in a large number of these establishments there is no wage-paid employment. It is obviously difficult to estimate the changes in employment in all such unorganised sectors. Further, even within the organised sectors due to non-availability of adequate and reliable all-India and regional statistics concerning employment of labour in mines, railways and plantations *on year to year basis for the entire period of plann-*

ing in the country, the analysis in this paper is confined to labourers of organised factories (submiting raturns under the Factories Act, 1948). Again, while analysing the all-India trend, trends in respect of four selected regions—Bombay (now comprising Maharashtra and Gujarat), West Bengal, U.P. and Madras representing western, eastern, northern and southern India, respectively,—with relatively higher factory employment have been studied (sub-divided into three sections pertaining roughly to I, II and III Plan periods) in order to make allowances for local variations in the pattern of employment.

Employment Trends[1]

Following is the year to year analysis of employment trends for the period 1951-63, as based on the following two tables showing changes in average daily employment in registered factories during the three Plans so far.

1951

The average daily employment in registered factories submitting returns under the Factories Act, 1948 increased from

1 The employment data suffers in main from the following handicaps :—

(a) The boundaries of states have undergone changes which have affected the coverage from time to time. Some areas of states have been included in the statistics for the first time or some districts were transferred from one state to another or some new states have emerged after the reorganisation of states. As such, estimates available for a state for a later year cannot be used for eliminating for an earlier year. This would affect some area estimates, which would in turn affect the all-India estimate also.

(b) Employment figures upto 1963 relate only to those registered factories which submitted returns, except for West Bengal. In 1954, for the first time, estimates of employment in factories were available for the ten Part 'A' states and Ajmer, Coorg, Delhi and Andaman and Nicobar Islands. However, only since 1956-57 some other state governments are also submitting returns.

(c) Some states like Jammu and Kashmir, Mysore, etc. either do not submit annual returns or submit very defective returns.

2504 thousands in 1950 to 2537 thousands in 1951, i.e., by about 1.3 per cent. Regionwise, the corresponding increase in employment in Madras by 6.5 per cent (to 313 thousands) was almost entirely due to fresh registration of factories under the revised Factories Act, 1948. West Bengal also recorded a mild increase by 2 per cent to 655 thousands in 1951, the cotton mill industry being mainly responsible for this increase. Three new cotton mills came into existance in this state while a fourth one which had remained closed for several years was revived. The apparent fall in Bombay by 0.7 per cent (to 768 thousands) and Uttar Pradesh by 12.9 per cent (to 20 thousands) was largely due to the non-inclusion of information relating to Defence installations in 1951.

1952

During 1952 the corresponding employment mildly increased to 2567 thousands, i.e., by 1.2 per cent over 1951. Regionwise, the increase in employment in Uttar Pradesh was by 18.3 per cent to 240 thousands due to the better reporting on the part of the factories under the Act. Bombay recorded a mild increase by 2.5 per cent (to 787 thousands) due to the extension of the scope of the Act in the state. On the contrary, Madras revealed a fall by 2.3 per cent (to 306 thousands) mainly because of the removal of tobacco barns from the purview of the Act. West Bengal also like Madras showed mild decline by 1.2 per cent (to 647 thousands).

1953

During 1953 the average daily employment in registered factories (unlike the preceding two years) fractionally declined just by 0.1 per cent (to 2528 thousands) mainly due to a greater extent of non-submission of returns in 1953. Regionwise, while West Bengal, Madras and Bombay revealed declines by 3.1 per cent, 1.5 per cent and 0.2 per cent, Uttar Pradesh showed a mild rise by 0.9 per cent during the year ; the employment figures for West Bengal, Madras, Bombay and Uttar Pradesh for the three years were 627 thousands, 301 thousands, 787 thousands and 242 thousands, respectively.

1954

The rising trend in all-India employment noticed since the beginning of the First Plan, which was slightly reversed in 1953, gently revived in 1954. The average daily employment in registered factories mildly increased to 2590 thousands showing a rise of 0.9 per cent over 1953. Regionwise, excepting Uttar Pradesh where there was a mild decline by 0.9 per cent to 240 thousands, increases, though varying in degree, were recorded in the other three regions. The corresponding employment figures were 810 thousands showing an increase of 3.6 per cent in Bombay, 329 thousands showing an increase of 9.2 per cent in Madras and 710 thousands denoting a rise of 13.3 per cent in West Bengal.

1955

During 1955 employment further increased to 2690 thousands (in registered factories submitting returns under the Factories Act) showing a rise of 3.8 per cent over the preceding year. Regionwise, while Madras and Uttar Pradesh recorded increases by 5.2 per cent (to 328 thousands) and 2.5 per cent (to 246 thousands), respectively. West Bengal and Madras showed declines by 13 per cent (to 617 thousands) and 0.3 per cent (to 328 thousands), respectively.

Summary

Thus, on the whole, we notice a generally rising trend of factory employment almost throughout the First Plan period. On a perusal of the foregoing regional trends one is struck by not only the differences in the degree but also occasionally by the direction of the variation during the period 1951-55. Further, apart from real changes in employment the yearly changes in coverage of the Factories Act and the regional and temporal variations in the extent of the periodical returns submitted by the factories were not less important.

Over roughly the First Plan period as a whole, we notice increases in employment ranging from 7.4 per cent (in all-states) to 5.5 per cent in Uttar Pradesh, 10.3 per cent in Bombay

and 11.5 per cent in Madras. On the contrary, a moderate decline by 3.9 per cent was witnessed in Madras during the same period.

II

1956

The average daily number of workers employed in registered factories submitting returns under the Factories Act, 1948 increased from 2690 thousands in 1955 to 3402 thousands in 1956 showing a rise by almost 26.5 per cent. Regionwise, among the four (selected) regions, while the three (Bombay, Uttar Pradesh and West Bengal) revealed increases, though varying in degree, Madras showed a decline by 6.1 per cent (to 308 thousands from 328 thousands in 1950). During the year, while Bombay recorded a rise by 14.1 per cent (to 1052 thousands), West Bengal showed the smallest rise by 10.5 per cent (to 682 thousands). The corresponding rise in the case of Uttar Pradesh was 11.5 per cent (to 274 thousands).

1957

The rising trend in factory employment broadly witnessed since 1950 continued during 1957 showing an increase in employment by 2.3 per cent (to 3480 thousands). Regionwise, the highest rise was recorded in Madras by 5.5 per cent, though the employment figure (325 thousands) was still significantly below that of the peak of 1954 (329 thousands). While Uttar Pradesh showed an increase of 3.3 per cent (to 283 thousands), Bombay 2.5 per cent (to 1076 thousands) and West Bengal 0.9 per cent (to 688 thousands) over the preceding year.

1958

The corresponding employment showed further increase to 3635 thousands in 1958 showing a rise of 4.3 per cent over the preceding year (on top of a rise of 26.5 per cent in 1956 and

[1] Employment figures of the areas subsequently comprising Andhra Pradesh have been excluded from Madras even for the years 1950-52 for the sake of a uniform comparative study over the entire period of planning in India.

2.3 per cent in 1957). Regionwise, among the four regions, while fractional declines by 0.3 per cent, 0.9 per cent and 1.8 per cent were recorded in West Bengal, Bombay and Uttar Pradesh, respectively, Madras showed a fractional rise of 0.4 per cent over the preceding year. The employment figures for Bombay, Madras, Uttar Pradesh and West Bengal, respectively, were 1067 thousands, 326 thousands, 278 thousands and 686 thousands.

1959

Unlike the preceding years of the Plan, employment instead of rising remained at the preceding year's level (3635 thousands) during 1959. Regionwise, excepting Madras where a moderate decline by 1.2 per cent (to 323 thousands) was witnessed, increases of varying degree were revealed by the other three regions. Uttar Pradesh showed the highest rise by 5.5 per cent to 293 thousands followed by Bombay (1.1 per cent to 1078 thousands), the smallest rise being in West Bengal by 0.6 per cent to 691 thousands.

1960

During 1960 the employment trend was rising both on countrywide and regional basis. The all-states figure of factory employment in the year was 3764 thousands showing a moderate rise by 3.6 per cent. Uttar Pradesh showed the highest rise by 7.2 per cent to 314 thousands followed by Bombay[1] (4.8 per cent to 1130 thousands), the least increase being in Madras (1 per cent to 325 thousands). The corresponding increase in West Bengal was of 4.6 per cent to 723 thousands.

Summary

Taking roughly the Second Plan period as a whole, we notice that the all-India figure of employment broadly indicated a rising tendency throughout the Second Plan period. The all-India pattern was witnessed to a considerable extent in

[1] Employment figures of Maharashtra and Gujarat—the two divisions of the old Bombay State—have been added for the sake of a uniform study.

TABLE I

Daily Average Number of Workers Employed during the Plans (in thousands)

State	1950	First Plan					Second Plan					Third Plan			% increase in the first half of 1963 over	
		1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1st half of 1963	1960	1950
Bombay	773 ...	768 (− .7)	787 (+ 2.5)	783 (− 0.2)	810 (+3.6)	863 (+5.2)	1052 (+14.1)	1076 (+2.5)	1067 (−0.9)	1078 (+1.1)	1130 (+4.8)	1188 (+5.1)	1228 (+3.9)	1254 (+2.1)	5.6	62.2
Madras	294 ...	313 (+ 6.5)	306 (− 2.3)	301 (− 1.5)	329 (+9.2)	328 (−0.3)	308 (− 6.1)	325 (+5.5)	326 (+0.4)	322 (−1.2)	325 (+1.0)	330 (+1.6)	342 (+3.5)	349 (+2.0)	8.8	18.7
U.P.	233 ...	203 (−12.9)	240 (+18.3)	242 (+0.9)	240 (+ 0.9)	246 (+2.5)	274 (+11.5)	283 (+3.3)	278 (−1.8)	293 (+5.5)	314 (+7.2)	338 (+7.4)	351 (+3.8)	360 (+2.8)	6.5	54.5
W. Bengal	642 ...	655 (+ 2)	647 (− 1.2)	627 (−3.1)	710 (13.3)	617 (−13)	682 (+10.5)	688 (+0.9)	686 (−0.3)	691 (+0.6)	723 (+4.6)	739 (+2.2)	796 (+6.1)	826 (+3.8)	14.2	28.7
All States	2504 ...	2537 (+ 1.3)	2567 (+ 1.2)	2528 (0)	2590 (+ 0.9)	2690 (+3.8)	3402 (+26.5)	3480 (+2.3)	3635 (+4.3)	3635 (0)	3764 (+3.6)	3917 (+4.0)	4112 (+4.0)	4197 (+2.1)	11.5	67.6

N.B. :—Figures in brackets indicate percentage variation in employment over the preceding year.

Source :—Files of the Indian Labour Gazette (1955-59) and the Indian Labour Journal (1960-64).

Bombay, Uttar Pradesh and West Bengal where except in 1958 (when mild declines of varying degree were recorded), the rising trend was well maintained. On the contrary, the year to year movements appeared to be on a plateau in the case of Madras.

Further, between the two Plan periods as a whole, we notice a striking improvement in employment situation during the Second Plan as compared to that of the First Plan on an all-India as well as regional bases. Besides, during the ten-year period factory employment was more than doubled in the country as a whole and near-doubled in the Bombay region. The corresponding increases in the other three (selected) rigions over the same period were 35 per cent in Uttar Pradesh, 13 per cent in West Bengal, and 11 per cent in Madras.

III

Coming to the Third Plan we notice a rising trend in employment in all the regions, though varying in degree. In the Bombay region employment which stood at 1130 thousands in 1960 increased to 1186 thousands (5.1 per cent) in 1961, 1228 thousands (3.9 per cent) in 1962 and 1254 thousands (2.1 per cent) in the first half of 1963. The employment index with base 1950=100 (Table II) moved from 146.2 in 1960 to 153.7 in 1961, 159.9 in 1962 and 163.4 in the first half of 1963.

In the Madras region employment which stood at 323 thousands in 1960 increased to 330 thousands (1.6 per cent) in 1961, 342 thousands (3.5 per cent) in 1962 and 349 thousands (2.0 per cent) in the first half of 1963. The employment index moved from 110.5 in 1960 to 112.3 in 1961, 116.1 in 1962 and 118.1 in the first half of 1963.

Employment in U.P. increased from 314 thousands in 1960 to 338 thousands (7.4 per cent) in 1961, 351 thousands (3.8 per cent) in 1962 and 360 thousands (2.8 per cent) in the first half of 1963. The corresponding index which stood at 134.9 in 1960 rose to 145 in 1961, 150.5 in 1962 and 154.4 in the first half of 1963.

TABLE II

Index of Daily Average Number of Workers Employed (1951-63)

(Base : 1950=100)

States	First Plan					Second Plan				Third Plan			
	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Bombay	99.3	101.8	101.3	104.9	110.3	135.9	139.2	138.0	139.5	146.2	153.7	159.9	163.4
Madras	106.5	104.0	102.4	111.9	111.5	104.7	110.5	110.9	109.5	110.5	112.3	116.1	118.1
W. Bengal	102.0	100.8	97.6	110.6	96.1	106.2	107.2	106.9	107.6	112.6	115.1	122.3	126.9
Uttar Pradesh	87.1	103.0	103.9	103.0	105.5	117.6	121.5	119.3	125.8	134.9	145.0	150.5	154.4
All States	101.3	102.5	102.5	103.4	107.4	135.9	139.0	145.1	145.1	150.3	156.4	162.6	165.9

Source :—Index Numbers have been constructed by the author himself on the basis of employment figures collected from the files of the Indian Labour Gazette (1955-59) and the Indian Labour Journal (1960-64).

In West Bengal employment increased from 723 thousands in 1960 to 739 thousands (2.2 per cent) in 1961, 796 thousands (6.1 per cent) in 1962 and 826 thousands (3.8 per cent) in the first half of 1963. The employment index moved from 112.6 in 1960 to 115.1 in 1961, 122.3 in 1962 and 126.9 in the first half of 1963.

The all-India employment figure which stood at 3764 thousands in 1960) rose to 3917 thousands (4 per cent) in 1961, 4112 thousands (4 per cent) in 1962 and 4197 thousands (2.1 per cent) in the first half of 1963.

Thus we notice that within the four selected regions the increase in employment during the first half of 1963 over 1960 was highest in West Bengal (14.2 per cent) remotely followed by Madras (8.8 per cent) and U.P. (6.5 per cent), the least increase being in Bombay (5.6 per cent). On the contrary, when employment in the first half of 1963 is compared to that of 1950 we note that the highest increase in Bombay (62.2 per cent) was closely followed by that of U.P. (54.5 per cent) and remotely by that of West Bengal (28.7 per cent) the least increase being in Madras (18.7 per cent).

So far as the all-India variation in employment is concerned we find an increase of 11.5 per cent in the first half of 1963 over 1960, which was second only to that of the West Bengal region but much larger than thate of the other regions. However, over the entire Plan period (1st half of 1963 over 1950), the increase in employment on the all-India level was much higher (67.6 per cent) than that of West Bengal (28.7 per cent) and also higher than that of the other regions.

These trends lead to an inference that the increase in employment over the three Plan periods taken together has been less conspicuous in the case of Madras and West Bengal than Bombay and U.P. (besides also non-selected regions).

PROGRESS OF RESEARCH IN THE COLLEGE OF SCIENCE

[1963-64]

Department of Botany

Professor R. Misra, Dr. K. C. Misra, Dr. S. S. Ramam Dr. R. S. Ambasht, Dr. H. R. Sant and Shri R. S. Tripathi amongst the staff members and fourteen research scholars are engaged in research on ecology of higher plants. Some special aspects in the study of vegetation of specialized habitats such as walls, usar-lands, forests of Chakia region, watershed areas of Chandraprabha and Karamnasa rivers and local grasslands are under investigation. Ecology of weed invasion in crop fields, autecology of (a) some weeds and grasses such as *Eleusine indica*, *Anagalis arvensis*, *Alhagi camelorum*, *Echinops echinatus* and (b) of medicinal plants like *Gomphrena celosiodes*, *Boerhaavia diffusa*, *Chenopodium album*, *Ageratum conyzoides*, *Argemone mexicana*, *Bacopa monnieri*, *Scoparia dulcis*, *Solanum xanthocarpum*, *Pauwolfia serpentina*, *Rauwolfia canescence*, *Uraria picta* and *Cassia occidentalis* are under investigation.

Other problems relating to such aspects as (a) Xeromorphy in relation to soil salinity and alkalinity, (b) Drought susceptibility of grassland species, and (c) Cytoecological studies of *Ageratum conyzoides* and *Argemone mexicana* are also being tackled.

Besides the University and departmental libraries, full use of the Indian Botanical Society library which is also housed in this department, is made by Staff and students engaged in research. The headquarter of the International Society for Tropical Ecology is also in this department and its journal 'Tropical Ecology' which is published under the guidance of Prof. R. Misra and Dr. K. C. Misra has a wide circulation and affords additional opportunity to students of ecology to be benefited. Results of researches are periodically discussed in meet-

ings of the B.H.U. Botanical Society and Ecological Research Circle.

Dr. R. N. Singh, Dr. Y. S. R. K. Sharma, Dr. J. N. Misra, Dr. C. S. P. Rao, Dr. E. R. S. Talpasayi, Dr. Y. B. K. Chowdary and Dr. C. S. Singh amongst the staff members and seven research scholars are engaged in researches on various aspects of algae like seasonal succession of phytoplankton of temporary ponds, systematics and morphology of fresh water red algae, cytology of red algae, cytogenetic and cytotaxonomic studies of Cherophyseae and Charophyta, cytological and physiological studies of *Cephaleuros*, physiology and genetics of the blue-green algae, factors controlling spore formation and germination in Nostocaceae, formation and germination of heterocysts of *Comptylonema*, physiology and formation of gas vacuoles, cellular localization of enzymes concerned with respiratory metabolism and polyphosphates of blue-green algae.

Dr. R. Y. Roy and Dr. R. S. Dwivedi amongst the staff members and four research scholars are carrying on research in Mycology and plant pathology in the department pertaining to several problems such as ecology of soil fungi, seasonal variations in soil fungal flora of some natural grass plots, succession of fungi on some decaying grasses and rhizosphere mycoflora of some forbs, cultivated and wild legumes. The observations recorded so far show interesting results pertaining to the destribution of fungi in plots harbouring different grass species. Results obtained indicate that there is some correlation between the fungal population and surface cover. Study of soil fungal flora in different seasons of the year reveals that there is variation in fungal population to some extent and a few dominant forms like *Mucor hiemalis*, *Chaetomium globosum*, *Thielavia terricola*, *Penicillium humicola*, *Paecilomyces fusisporus*, *Aspergillus niger*, *A. terreus* and *Fusarium nivale* persist throughout the year.

Studies on succession of fungi on decaying grasses like *Cynodon dactylon* Pers., *Eothriochloa pertusa* A. Camus and *Dichanthium annulatum* Stapf; are being carried out from diffe-

rent regions of plants. Observations show that there is fungal succession through a few forms like *Curvularia lunata*, *Tetraploa ellisi*, *Spegazzinia tessarthra* and *Periconiella echinochloae* persist almost throughout the year.

Investigations on rhizosphere mycoflora of some forbs wild and cultivated legumes are being done since July, 1963. Comparative study of fungal flora from the rhizospheres and away from the rhizospheres effect of hormones and trace elements upon the growth of plants and the effect of latter on fungal population in potted condition form the parts of present investigations. The observations recorded so far on this aspect show that the fungal population in the rhizospheres and away from rhizospheres differs. The dominant forms are being recorded.

During the course of investigations mentioned above a number of fungi new to science as well as new records for the country have been found and published in research journals both Indian and foreign. Results of researches are periodically discussed in meetings of the B.H.U. Botanical Society.

Staff abroad for higher studies :

1. Dr. K. L. Mukherjee — Iowa, U.S.A. (Plant Physiology)
2. Shri D. N. Rao — Ottawa, Canada (Bryophytes)
3. Dr. S. K. Roy — Leeds, England (Pteridophyta)

Research Projects :

C..S.I.R.—Senior 2, Junior 5.
U.G.C.—2.
Research Training Scheme—7.
Postgraduate Institute of Indian Medicine (Ecology of Medicinal plants)—7.

Ph.D. Thesis (1963) :

1. R. S. Ambasht — Root habits in response to soil erosion, silting and inundation.
2. V. G. Nelivigi — Ecology of grazing effects and reproductive capacity of six forbs in the grass vegetation of Varanasi.

3. R. S. Srivastava 'Autecological studies of two Malvaceous weeds of Gorakhpur (Agra University).
4. K. Subbaramaiah Refractometry of living cells of algae.
5. H. N. Singh Nature of occurrence of three different nitrogen fixing species of blue-green algae in the rice fields of south Bihar (Kulharia) and their identification.

Teachers from other Universities and Scientific Officers from research institutes who joined the Department for research :

1. V. G. Nelivigi (Belgaun College) Karnatak University. Obtained Ph.D. degree.
2. J. D. Sah For Ph.D. research from Bhagalpur University.
3. P .S. Rao To learn cytological techniques from Central Salt Marine Research Institute, Bhavanagar.

Papers published :

Ambasht, R. S. Ecological problems in the tropics-erosion in relation to vegetation in two areas of Varanasi. Proc. Nat. Acad. Sci. (India) *33* : 158-162, 1963.

Chowdary, Y. B. K. On the cytology and systematic position of *Physolinum monitia* Printz. The Nucleus *6*(1) : 43 : 48, 1963.

Khanna, P. K. Additions to the fungi of India. Curr. Sci. *32* : 175-176, 1963.

Misra, R. The science of vegetation with reference to India. Bull. Bot. Surv. India *4* : 113-118, 1962.

Misra, R. Problems of adaptation amongst herbaceous plants of the tropics. Proc. Nat. Acad. Sci. India. *33*, 1963.

Misra, R. R. A new record of ascigerous mould from India. Curr. Sci. *32* : 177-178, 1963.

'Ramam, S. S. Ecological perspective on grasslands. Proc. Nat. Acad. Sci. *33*, 1963.

Sant, H. R. — Effect of grazing on the general herbage of Banaras Hindu University grounds and a study of seed character and reproductive capacity of four weeds. Proc. Nat. Acad. Sci., *33*: 1963.

Sarma, Y. S. R. K. — On a collection of algae from Rael 'Tal' of district of Varanasi. J. Sci. Res., B.H.U. *13*: 382-92, 1962-63.

Morphological notes on some members of Ulotrichales. Ibid. *13*: 393-98, 1962-63.

Contributions to the Karyology of Ulotrichales—I, *Ulothrix*. Phycologia *2*, 173-183, 1963.

Contributions to the Karyology of Ulothrichales—II, *Microsora*—The Nucleus. *16*: 173-183, 1963.

Talpasayi, E. R. S. — Nitrogen fixation by photosynthetic organisms in recent advances in biochemistry. Proc. Summer School in biochemistry, Srinagar. Ind. Institute of Science, Bangalore, Page 352-356.

Polyphosphate containing particles of blue-green algae. Cytologia *28*: 78-80.

Twenty two papers submitted by the staff and Research Scholars of the Deparment have been Communicated to various Botanical Journals and have been accepted for publications. Fifty three papers were read and discussed at different Conferences & Indian Science Congress session 1963-64.

Department of Geography

1. *Visit of Eminent Scientists :*

Following persons visited the department and delivered lectures :

1.	Dr. Miss Irrawathy; Principal, Queen Mary College, Madras.	"Role of Geographers in National Defence".
2.	Major G. Bannerjee, Indian Army.	"Indian Army recounted his impressions of Congo".
3.	Dr. Mohd. Shafi, Prof. & Head, Department of Geography, Aligarh Muslim University.	"Land Use Survey".
4.	Dr. Gurdev Singh Ghosal, Head, Geography Department Punjab University, Chandigarh.	"Some Fundamental Concepts of Geography".

2. *Award of Research Fellowships :*

1.	Dr. M. N. Nigam,	"Research fellowship from U.G.C."
2.	Shri N. D. Bhattacharya,	"U.G.C. Scholarship Under Humanities".
3.	Shri K. K. Dube,	,, ,, ,,
4.	Shri Bechan Dube,	,, ,, ,,
5.	Shri R. B. Singh,	,, ,, ,,
6.	Shri H. S. Gupta,	,, ,, ,,
7.	Shri S. C. Singh,	"R.T.S. Scholarship"
8.	Shri Onkar Singh,	"Pt. Bhagwan Din Dube & Mrs. Ram Dulari Dube Scholarship"
9.	Shri Vinay Kumar Asthana,	,, ,, ,,

3. *Publications of the Department :*

(i) Sutlej Yamuna devide : A Study in Post-partition Growth of Small Towns from Pre-existing Rural Settlements. Vol. IX, Pt. 2, June, 1963 N.G.J.I., Varanasi-5. Dr. A. S. Jauhari, Reader in Geography,

(ii) An Introduction to Geobotony of Murshidabad. Shri G. N. Choudhari, Lecturer in Botany, B.H.U. and Shri N. D. Bhattacharya, Research Scholar in Geography,

(iii) Road Traffic Survey of Varanasi. Dr. R. L. Singh, Prof. & Head, & Dr. U. Singh, Reader, Geography Department,

(iv) Evolution of Azamgarh, N.G.J.I., Vol. IX, Pt. 3 & 4, Sept. & Dec., 1963, Shri S. C. Singh, Research Scholar in Geography.

List of books and thesis published :

(i) Allahabad : A Study in Urban Geography. Dr. U. Singh, Reader in Geography, Pub. N.G.J.I., Varanasi-5, pp., 1963.

(ii) The Himalayan Beas Basin : A Study in Habitat Economy and Society. Dr. S. L. Kayastha, Reader in Geography, to be Pub. from B.H.U.

4. *Other activities of the Department :*

The following research scholars submitted their Ph.D. thesis and the first three have got Ph.D. degree in December, 1963.

1. Shri K. N. Singh, "Rural Markets and Urban Centres in Eastern U.P."
2. Shri R. B. Singh, "Transport Geography of U.P."
3. Shri Basant Singh, "Land Utilization of Chakia Tahsil, Varanasi".
4. Shri S. P. Singh, "Bhagalpur : A Study in Regional Geography".
5. Shri P. N. Lal, "Andman Island : A Study in Regional Geography".

Department of Physics

I. The following eminent scientists from foreign countries visited the department of Physics this year (after July 1963) and delivered lectures under the auspcious of the Physical Society :

1. Dr. A. L. Mackay of University of London was here for about a fortnight and delivered a series of lectures on Electron Microscope Techniques.

2. Prof. I. S. Zheludev of the Institute of Crystallography, Moscow, U.S.S.R. gave two lectures on the Ferro electric materials and their studies.
3. Sir Lawrance Braag, F.R.S., Nobel Lawrate, Director of the Imperial Institute of Science, U.K. was a guest of our department for three days. He gave two popular lectures :
   (1) On Nature of things, and
   (2) On the Difference between Living and Non-living matter.
4. Prof. H. Lipson F.R.S. (U.K.) visited our laboratory in the month of Feb., '64. He gave two lectures in the Physical Society on X-ray Spectroscopy.
5. Dr. E. Kondaiah of Tata Institute of Fundamental Research, Bombay, gave a series of lectures on Nuclear Models on Nuclear Reaction during his one month stay here, on the invitation of the University in the month of November 1963.
6. Dr. Alibone F.R.S. of U.K. delivered Rutherford lecture on 16-2-64.

II. Award of Research Fellowships :

1. A scheme of about Rs. 5 lakhs was granted by the National Bureau of Standards U.S.A. to Prof. A. R. Verma, to conduct research on Solid State Physics.
2. Dr. P. Krishna, Lecturer in this Deptt. is visiting U.K. under the Exchange Programme between India and U. K. He will be in the Cavendish Laboratory at Cambridge for six months to learn Electron Microscope technique.
3. Dr. B. B. Tripathi, is visiting U.S.S.R. under the Exchange Programme between India and U.S.S.R. He will learn Electron Diffraction Technique for six months in the Institute of Crystallography, Moscow.
4. Mr. O. N. Srivastava and Mr. K. M. L. Srivastava were awarded the Senior Research Fellowships of C.S.I.R. and the Junior Fellowships were awarded to Mr. S. P. Verma, and Mr. R. P. Gupta.

5. Mr. P. L. Srivastava, a research scholar of this department attended the school on 'Lattice Dynamic' held at Copenhegen.
6. The department of Atomic Energy has sanctioned a Research scheme to Mr. P.N. Tiwari for doing research on Nuclear reactions.
7. Mr. O. N. Srivastava, research scholar under Dr. A. R. Verma, attended the School on "Electron Microscopy" held in the National physical laboratory, New Delhi and Mr. Govind Singh attended a training course on "Electron Computors" at the Indian Institute of Crystallography, Kanpur.

III. *Publications* :

The following papers were published from this Laboratory during the current session 1963-64 :

1. P. Krishna and A. R. Verma "A novel determination of the structure of an anomalous polytype of Silicon Carbide" Acta Crystallographica Vol. 17 (1964 p. 51-58.)
2. P. Krishna and A. R. Verma "A unique transformation of structure in Silicon Carbide". Indian Journal of Pure and Applied Physics. Aug., 1963.
3. P. Krishna and A. R. Verma "Anomalies in Silicon Carbide polytypes". Proceedings of the Royal Society (London). Vol. 272 (1963) p. 490 to 502.
4. A. R. Verma and P. Krishna "Dielocations and Polytypism in Silicon Carbide". Journal of Scientific and Industrial Research of India, Vol. 22 (1963).
5. P. Krishna and A. R. Verma "X-ray investigation of long-period structures of Silicon Carbide and their growth from imperfections". Crystallography and Crystal perfection. Academic Press, London (1963).
6. O. N. Srivastava and A. R. Verma "Studies on a new Polytype of Cadmium Iodide 28H". Acta Cryst. 1964 (In press).

2. Prof. I. S. Zheludev of the Institute of Crystallography, Moscow, U.S.S.R. gave two lectures on the Ferro electric materials and their studies.
3. Sir Lawrance Braag, F.R.S., Nobel Lawrate, Director of the Imperial Institute of Science, U.K. was a guest of our department for three days. He gave two popular lectures :
   (1) On Nature of things, and
   (2) On the Difference between Living and Non-living matter.
4. Prof. H. Lipson F.R.S. (U.K.) visited our laboratory in the month of Feb., '64. He gave two lectures in the Physical Society on X-ray Spectroscopy.
5. Dr. E. Kondaiah of Tata Institute of Fundamental Research, Bombay, gave a series of lectures on Nuclear Models on Nuclear Reaction during his one month stay here, on the invitation of the University in the month of November 1963.
6. Dr. Alibone F.R.S. of U.K. delivered Rutherford lecture on 16-2-64.

II. Award of Research Fellowships :

1. A scheme of about Rs. 5 lakhs was granted by the National Bureau of Standards U.S.A. to Prof. A. R. Verma, to conduct research on Solid State Physics.
2. Dr. P. Krishna, Lecturer in this Deptt. is visiting U.K. under the Exchange Programme between India and U. K. He will be in the Cavendish Laboratory at Cambridge for six months to learn Electron Microscope technique.
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5. P. Krishna and A. R. Verma "X-ray investigation of long-period structures of Silicon Carbide and their growth from imperfections". Crystallography and Crystal perfection. Academic Press, London (1963).
6. O. N. Srivastava and A. R. Verma "Studies on a new Polytype of Cadmium Iodide 28H". Acta. Cryst. 1964 (In press).

7. O. N. Srivastava and A. R. Verma "Anomalies in Polytypic structures". Investigations on Cadmium Iodide crystals, communicated to Roy, Soc. for publication.

8. O. N. Srivastava and A. R. Verma "Curious Cadmium Iodide structures" to be read at Solid State Physics symposium at Chandigarh.

9. G. Singh and A. R. Verma "Structure and growth of a new Poly type of Sic. 105R". Acta. Cryst. 1964. (in Press).

10. P. N. Tiwari. "Direct determination of angular distribution from measured angles in Allan's device-Nuclear Physics and Solid State" Physics Symposium, Chandigarh 1964.

11. B. Dayal and P. L. Srivastava "Phonan Spectrum of Sodium etc. Proc. Royal Soc. A (in Press).

12. B. Dayal and R. S. Srivastava "Phonan interaction in potassium" Prog. of Thear. Physics of Japan (in Press).

13. Dutta and Dayal "Lattice Constants and Thermal expansion of Au." Physics Status Solidi 3, 473. (1963)

14. Dutta and Dayal "Lattice Constants etc. of Pd. and W." Physics Status Solidi 3. 2253, 1963.

15. Dutta and Dayal "Lattice Constants etc. of Agcl." Physics Status Solidi (Communicated).

16. Pandey and Dayal "Brudhum—Furth equation of State of metals." Physica Status Solidi (Communicated).

17. P. L. Srivastava and R. S. Srivastava "Electrostatic coupling coefficients of body centered cnetri crystal." P.W.C. Physical Src. 62, 304, 1963..

18. Sharan and Datta "Atomic coordinates of $AlPO_4$" Acta Cryst. (in Press).

19. "Dendritic Growth of Tin Crystals from Solution" Shri B. Prasad and Dr. R. S. Sharma. Sent to Indian Science Congress Association (1962-63).

20. "Calculation of the Atomic Scattering factor of the atom with the help of six term Hylleraas Wave function" by M. L. Rustogi, M-M-Sh and A. N. Tripathi published in Acta Cryst. 16, 926 (1963).
21. Nuclear magnetic shielding constants and X-ray scattering factors—M. L. Rustgi and P. Tiwari. Journal of Chem Phys. 39, 2590, (1963).
22. Atomic scattering factor of Helium like system from analytic Hartree fock wave functions. P. Tiwari and M. L. Rustgi. Acta. Cryst. (in Press).
23. Stability of Octupole deformation in medium mass nuclii. by M. L. Rustgi and S. N. Mukherji. Phys. Rev. 131, Sept. 15. (1963) p. 2615.
24. Structure of even nuclii. by M. L. Rustgi and S. N. Mukherji. Phys. Rev. (To be published).
25. Circular polarization correlation of Sc^{46} and chemical form of the source. Nuclear Physics, 45, 529-554 (1963).
26. The spins of Pn^{144} from—correlation measurements, Physics Letters, 5, 329-331 (1963).

IV. The following members of the teaching staff are studying abroad :

(1) Dr. R. N. Singh	(U.S.A.)
(2) Dr. S. G. Lele	(U.S.A.)
(3) Mr. V. Srinivasan	(U.K.)
(4) Dr. M. L. Rustgi	(U.S.A.)
(5) Dr. P. Krishna	(U.K.)

Mr. B. N. Dutta submitted his Ph.D. Thesis on "Thermal Expansion Measurements" under Dr. B. Dayal.

Department of Spectroscopy

A symposium on 'Spectroscopy and Allied Problems' was organised by the Department under the auspices of Council of Scientific and Industrial Research in Nov., 1963. A large number of distinguished spectroscopists and a number of young research workers from various Universities attended. The symposium was inaugurated by Prof. R. K. Asundi.

The members of the department took active interest in the symposium and Dr. I. S. Singh, D. K. Rai, S. K. Tiwari, R. B. Singh and M. G. Jayswal presented papers. Dr. R. N. Singh, D. K. Rai, S. N. Singh, R. B. Singh and O. N. Singh attended the symposium on Raman and Infrared Spectra held at Ernakulam. Dr. R. N. Singh and D. K. Rai presented papers. Dr. I. S. Singh attended the Summer School at Ooty. Its proceeding have been published.

In addition to the distinguished participants in the symposium, almost all the foreign visitors to the Department of Physics visited this Department.

Award of Scholarships

Junior research fellowships were awarded to Mr. K. M. Lal, Mr. O. N. Singh, Mr. V. B. Singh and Mr. V. N. Sharma by the C.S.I.R. (New Delhi).

Publications

The following papers were published from this department during the current session :—

1. D. K. Rai & A. N. Tripathi — Potential Energy Curves and Dissociation products, Can. J. Phys., *42*, 452, (1964)
2. K. N. Upadhyaya — (*a*) Spectra of Ethyl Benzene in the ultraviolet XIV(1), 173, 1963-64.
   (*b*) Emission spectra of o-dichlorobenzene Vol. XIV 136, 1963-64.
3. R. N. Singh — (*a*) Near U. V. Absorption spectrum of p-tolualdehyde by N. L. Singh & R. N. Singh, J. Sc. Res. Vol. XIV (1) p. 76, 1963-64.

		(*b*) Electronic spectra of Isomeric Tolunitrile part I Near U. V. absorption and emission spectra of o-tolunitrile by N. L. Singh & R. N. Singh, J. Sc. Res. (B.H.U.) Vol. XIV(1) p. 99
		(*c*) Part II. Near U. V. absorption spectrum of m-tolunitrile by R. N. Singh J. Sc. Res. Vol. XIV(2) p. 45.
4.	R. J. Singh	Near U. V. Spectra of substituted Benzenes by N. L. Singh & R. J. Singh J. Sc. Res. B.H.U. Vol. XIV (1) p. 86, 1963-64.
5.	Satya Prakash	Near ultraviolet spectrum of Phenetole, J. Sc. Res. (B.H.U.) Vol. XIV (2) 1963-64, p. 111.
6.	R. S. Singh & M. G. Jayswal	Visible emission spectra of Benzoquinone, Ind. J. Pure & App. Phy.
7.	K. N. Upadhyaya & J. N. Rai	Emission and fluorescence spectra of-p-dichlorobenzene, Ind. J. Pure & App. Physics, Vol. 2, 284, 1964.
8.	K. N. Upadhyaya & J. N. Rai	Near U. V. Emission spectra of p-chloroanisole J. Sc. Res. B.H.U. Vol. XIV, 116, 1963-64.

Following research scholars received their Ph.D. degrees in the University Convocation held in December, 1963.

1.	Shri R. N. Singh,	"Electronic Spectra of O, m and p-toluntrile, Styrene and p-tolualdehyde.

2. Shri D. K. Ghosh, "Spectroscopic studies of some di-Substituted Benzenes."
3. Satya Prakash, "Spectral studies of Phenol, Anisole, Phenetole and Mono-bromobenzene."
4. Shri G. Venketaswarlu, "Spectral studies in Mercury halides."
5. Shri R. J. Singh, "Electronic spectra of substituted benzenes."

Shri S. P. Singh submitted thesis on the "Spectral studies on lead and Bismuth Halides." He got Ph.D. degree in Dec., 1964.

राम की शक्ति-पूजा

[विश्लेषण की भूमिका]

महेन्द्र नाथ दुबे, सह-सम्पादक 'प्रज्ञा'

'राम' भारतीय चिन्तन परम्परा में प्रतिष्ठित एक ऐसे लोक-नायक हैं जो सर्वमान्य-शक्ति के प्रधान आधिष्ठान हैं। आदि कवि महर्षि वाल्मीकि से लेकर कालिदास, भवभूति, जयदेव, तुलसी, केशव आदि अनेक महाकवियों की वाणी ने राम की सुकीर्त्ति की पताका लहराने में योग दिया है। भारतीय उद्‌गाथक् जहाँ-जहाँ भी ऐश्वर्य, शक्ति एवं कान्ति का परिप्रेक्षण करता है वहीं उसे राम की शक्ति का श्रोत दृष्टिगोचर होता है। महर्षि वाल्मीकि ने अपनी रचना आरम्भ करने के पूर्व ब्रह्मर्षि नारद से ऐसे ही व्यक्ति के प्रति जिज्ञासा प्रकट की थी जो गुणवान, वीर्यवान, धर्मज्ञ, कृतज्ञ, सत्य में दृढ़प्रतिज्ञ, चरित्र से युक्त, प्राणिमात्र का हितैषी, विद्वान्, समर्थ और अन्य सभी गुणों का आश्रय स्थल हो। प्रत्युत्तर में नारद ने उक्त गुणों से युक्त राम का ही बखान किया था, तभी से रामकथा रूपी श्रोतस्विनी की धारा प्रवाहित हो चली। राम को लेकर भारतीय जन-मानस इतना राममय हो गया है कि पाश्चात्य चश्में से देखने वाले समीक्षक के लिए भारतीय वाङमय में वैविध्य का अभाव ही परिलक्षित होता है; तो भी भारतीय कवि प्रसन्नराघव के प्रणेता जयदेव के स्वर में स्वर मिलाकर अब भी कहता है :—

स्वसूक्तीनां पात्रं रघुतिलकमेकं कलयतां
कवीनां को दोषः स तु गुणगणानामवगुणः।
पदेतैर्निःशेषैपरगुण लुब्धैरिव जग—
त्यसावेश्चक्रे सतत सुख संवास वसतिः॥

अर्थात् "राम कथा का ही हर प्रकार से आश्रय-ग्रहण कवियों की प्रतिभा हीनता का सूचक नहीं है अपितु मर्यादा पुरुषोत्तम राम के महनीय गुणों का ही अवगुण है। राम में समग्र गुण समुदाय अपने सम्पूर्ण वैभव के साथ इस रूप में रमे हुए हैं कि उनकी ओर आकृष्ट न होना कवियों के बल-बूते की बात ही नहीं"—और फिर अपना आदर्श भी तो यही है—

कीरति भनिति भूति भलि सोई।
सुरसरि सम सब कहँ हित होई॥
कवि कोविद अस हृदय विचारी।
गावहिं हरि-जस कलिमल हारी॥

(रामचरित मानस-बालकाण्ड)

इन्हीं आदर्शों के परिणाम स्वरूप भारतीय ऐतिहासिक विकास के साथ ही साथ राम-कथा का भी इतिहास बनता गया है। लेकिन इस कथा में आधुनिक युग में आकर एकाएक ऐसी नई उद्‌भावना का उद्रेक हुआ जो भारतीय मान्यताओं से किञ्चित दूर पड़ती

है। फलस्वरूप भारतीय मानस में एक झंझावात सा आ गया। समूचे राम-कथा साहित्य के इतिहास में जो वस्तु सर्वत्र प्राप्त है, वह है; सारी विभूतियों के आकर राम ही है। कहीं भी उनमें कोई कमी नहीं है; वे स्वयं-प्रणेता, अनादि और अविनाशी हैं। नर-रूप का ग्रहण वे अपनी लीला के लिए करते हैं। यद्यपि सामान्य जन की भाँति रति, शौर्य, क्रोध और करुणा के भाव उनमें भी उठते हैं; यहाँ तक कि वे वेदना व्याकुल हो कहीं-कहीं 'दुख संवेदनायैव रामेचैतन्यमर्पितम्' (उत्तर रामचरित) भी कह उठते हैं, तथापि राम में कोई भी कमी भारतीय चिन्तक नहीं पाता, इसे वह उनकी लीलामात्र समझता है। उन्हें सामान्य नर-रूप समझने वाले द्रष्टा की ही कमजोरी देखता है।

राम देखि सुन चरित तुम्हारे।
जड़ मोहहिं बुध होंहि सुखारे।

(रामचरित मानस-बालकाण्ड)

रामचरित की इस सार्वभौम परम्परा से भिन्न दृष्टि सर्व प्रथम बौद्ध जातकों में देखने को मिलती है लेकिन धार्मिक विद्वेष प्रसूत होने से उन पर अधिक ध्यान नहीं दिया जा सकता। अपभ्रंश के जैन ग्रन्थों तथा दक्षिण भारतीय भाषाओं के रामाख्यानकों, विशेषकर कम्बु के रामायण में भी रामचरित की जो हीनता परिलक्षित होती है वह भी साम्प्रदायिक विद्वेष प्रसूत है। आधुनिक युग में सर्वप्रथम माइकेल मधुसूदन दत्त ने अपने 'मेघनाद-वध' काव्य में राम को सच्चे अर्थों में सामान्य मानव मानकर कथा का सर्जन किया तथा राम में आगत कमजोरियों को उन्होंने राम की लीलामात्र न मानकर सामान्य मानव जैसी कमजोरी ही स्वीकार किया। इसी से उनके राम सामान्य मानव की भाँति ही अन्तर मन से दुःख की अनुभूति करते हैं। परिणाम स्वरूप उनकी कातर वाणी सुनाई पड़ती है।

आकाशेर पाने चाहि कृतांजलि पुटे
आराधिला रघुवर; तव पदाम्बुजे
चायगो आश्रय आजि राघव-भिखारी।
अम्बिके ! भूलो ना देवि; ए : तव किन्करे।

(मेघनाद-वध काव्यम्)

बँगला साहित्य में मधुसूदन दत्त के पूर्व मध्ययुग में कवि कृत्तिवास ने भी अपने रामायण में राम को किञ्चित उद्विग्न दिखाया है तथा राम द्वारा विजय की कामना से शक्ति-पूजा का विधान किया है, परन्तु सूक्ष्म दृष्टि से देखने पर यही ज्ञात होता है कि कृत्तिवास का यह प्रयास शक्ति-पूजक बंगाल का प्रभाव मात्र है। रामचरित के बहाने कवि ने बड़ी पटुता से शक्ति की आराधना के हेतु अवसर निकाल लिया है। जैन एवं बौद्ध ग्रन्थों में धर्माग्रह पूर्ण कटुता का जो दर्शन होता है उसका आभास उनमें नहीं है। वस्तुतः उसमें साहित्यिक लालित्य में शक्ति के प्रति अधिक श्रद्धा ही मुखर है। यद्यपि मधुसूदन दत्त ने भी धर्मपरिवर्तन कर लिया था पर उनके चित्रण में भी धार्मिक कटुता नहीं है अपितु उसमें सदा से उपेक्षित एवं निंदित वग के प्रति समानुभूति की भावना ही अधिक गतिशील है।

माइकेल मधुसूदन दत्त ने अपने 'मेघनाद-वध' काव्य में राम कथा को किसी महत् अभिप्राय का अन्तराय न मानकर पूर्णतः यथार्थ रूप प्रदान किया है। उन्होंने पाश्चात्य

आंग्ल-साहित्य का सम्यक् अध्ययन किया था। उसकी प्राचीन एवं अर्वाचीन गतिविधि से वे पूर्ण विज्ञ थे। पाश्चात्य साहित्य का प्राचीन काव्यशास्त्र भी भारतीय मान्यताओं के अनुरूप उत्कृष्ट कोटि के कुलीन शूर-वीरों की कथा को ही साहित्य में विवेच्य मानता था। अरस्तू ने यद्यपि ट्रेजडी (दुखान्तकी) की अधिक प्रशंसा की है फिर भी उसके गम्भीर प्रभाव के लिए वह भी उत्कृष्ट घराने से ही पात्रों का चुनाव करने के पक्ष में थे। लेखकों की श्रद्धा भी प्रायः सद्गुण-सम्पन्न देव-कोटि के पात्रों के साथ ही अधिक होती थी। इस प्रकार साहित्य में सत् और असत् धर्मावलम्बी पात्रों की ऐतिहासिक सरणि सी बन गई थी। आगामी लेखक गण परम्परया उसे स्वीकार कर लेते थे। आधुनिक युग में मिल्टन ने अपने "पैराडाइज़ लास्ट" के माध्यम से इन पुरानी मान्यताओं का विरोध किया तथा असत् या खल कोटि के पात्रों को उसने अपनी सहृदय समानुभूति समर्पित की। तदनन्तर साहित्य-वांङमय में इस प्रकार के उपेक्षित पात्रों के प्रति भी उचित न्याय करने के नाम पर उनके भी महनीय गुणों का बखान किया जाने लगा। कवि श्री माइकेल पर इस प्रवृत्ति का स्पष्ट प्रभाव दृष्टिगोचर होता है। 'मेघनाद-बध' काव्य की भूमिका में उन्होंने इसे स्वीकार भी किया है।[1]

'मेघनाद-बध' काव्य का प्रणयन कुछ इसी प्रकार की मनोवृत्ति से हुआ। इसके लिए यद्यपि कवि को कुछ अन्यथा कल्पनाएँ भी करनी पड़ीं, फिर भी उसने उन्हें तद्वत ही स्वीकार किया और उन्हें पुनः पृथक् करने की बात कभी नहीं सोची। लक्ष्मण के उदात्त चरित्र पर जिस आक्षेप की चर्चा श्री योतीन्द्र जी ने की थी, उसके उत्तर में कवि ने यह कहकर बात टाल दी थी कि प्रत्येक मानवीय रचना में कोई न कोई त्रुटि होती ही है।[2]

अतः यह स्पष्ट है कि लेखक ने समझ बूझकर एक नई मान्यता प्रस्तुत की है। उसके राम या लक्ष्मण जहाँ कहीं माँ अम्बिका की दुहाई देते है वहाँ वे लीलामात्र प्रदर्शित नहीं करते अपितु यथार्थतः अत्यन्त दीन, कातर एवं असहाय स्थिति में होते हैं। मेघनाद-वध काव्य में भी विजयश्री राम के ही हाथ रहती है पर उस विजयश्री पर वैसा ही क्षोभ उत्पन्न होता है, जैसा कि महाभारत में जयद्रथ, दुर्योधन, कर्ण आदि की 'अभिमन्यु' पर की गई विजय से होता है। 'मेघनाद-बध' में देवराज इन्द्र मेघनाद द्वारा पराजित होने के कारण प्रतिशोध की भावना से सक्रिय रूप में राम पक्ष को अपना सहयोग प्रदान करते हैं।

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[1] People here gramble and say that the heart of the poet in 'Meghnād' is With the Rakshās and that is the real truth.

('लोग यहाँ एकत्र होते हैं और कहते हैं कि 'मेघनाद-वध' काव्य में कवि का हृदय राक्षस पक्ष के साथ है और यह यथार्थतः सत्य भी है।)

[2] The great 'jotindra' has only said that he is sorry, poor Lakshman is represented as killing Indrajita in cold blood and when unarmed. But I am sure the poem has many faults. What human production has not ?

(भूमिका-मेघनाद-बध काव्यम्)

वे इन्द्राणी समेत शिव, माया, शक्ति सबके समक्ष जाते हैं। राम के धर्म और रावण के अधर्म का बखान करते हैं, तदनन्तर राम की सहायता के लिए उन्हें प्रोत्साहित करते हैं। अन्य रामाख्यानकों की भाँति केवल राम पर देवताओं के साथ पुष्प बरसाने ही नहीं आते। 'मेघनाद-बध' के राम-लक्ष्मण वस्तुतः सहायता की अपेक्षा रखते हैं। अतः उनके द्वारा शक्ति की जो पूजार्चा सम्पादित कराई गई है, वह उन्हें स्पष्टतः असमर्थ दिखाकर ही।

'मेघनाद-बध' में शक्ति की पूजा राम द्वारा विधिवत नहीं कराई गई है अपितु इसका वैधानिक क्रम लक्ष्मण द्वारा पूरा किया गया है। राम केवल चिन्ता, दीनता और कायरता के क्षणों में शक्ति की गुहार भर लगा देते हैं, यद्यपि उनका भी अटल विश्वास है कि शक्ति की सहायता बिना विजय असंभव है, क्योंकि शिव तो स्पष्टतः रावण के पक्ष में हैं।

जहाँ तक माइकेल मधुसूदन दत्त द्वारा प्रस्तुत शक्ति के स्वरूप का प्रश्न है, वह एक 'कर्तुम् अकर्तुम् अन्यथा कर्तुम्' समर्थ शक्ति है जो सहज मायावी भी है। इन्द्र के प्रयासों से प्रसन्न हो वह स्वयं सुमित्रा के रूप में आकर स्वप्न में लक्ष्मण को आदेश देती है—

'उठ वत्स पोहाइल राति।
लंका उत्तर द्वारे बनराजि माझे,
शोभे सर, कूले तार चण्डीर देऊल
स्वर्नमय; स्नान करि सेई सरोवरे
तूलिया विविध फूल पूज; भक्ति भावे।[1]'

(मेघनाद-बध काव्यम्)

इस प्रकार की अराधना के अनन्तर देवी प्रकट होकर वर देती हैं तथा मेघनाद की 'वैश्वानर-पूजा' नष्ट कर उसे हतश्री करके विजित करने का उपाय बताती हैं। इतने पर भी जब लक्ष्मण युद्धार्थ प्रयाण करते हैं और राम निराश एवं खिन्न हो उन्हें युद्ध में न जाकर पुनः वन में लौट चलने को कहते हैं, उक्त अवसर पर पुनः शक्ति का सरस्वती रूप में उदय होता है, जो स्पष्ट कहती हैं—

उचित कि तव; कह हे वैदेही पति,
संशयित देववाक्य देवकुल प्रिय
तुमि? देवादेश बल; केन अवहेले[2]

(मेघनाद-बध काव्यम्)

तब कहीं जाकर राम, लक्ष्मण को प्रयाण करने देते हैं। इस प्रकार माइकेल द्वारा चित्रित राम शक्ति पूजा एवं शक्ति की कृपा की महती आवश्यकता रखते हैं।

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[1] (हे वत्स! रात बीत गई, अब उठो। लंका के उत्तर द्वार पर बनश्री में सरोवर के निकट एक चण्डी की स्वर्णमय प्रतिमा है उसी सरोवर में स्नान कर विविध फूलों को चुन, भक्ति भाव से पूजा करो!)

[2] (हे वैदेही पति यह तो बताओ कि क्या तुम्हारा देववाक्य के प्रति शंशय भाव उचित है। तुम देवकुल के प्रिय होकर भी देवादेश की अवहेलना क्यों कर रहे हो?)

कविश्री सूर्यकान्त त्रिपाठी निराला द्वारा चित्रित **राम की शक्ति-पूजा** भिन्न कोटि की है। यद्यपि उसपर बंग प्रदेशीय शक्ति-पूजा का प्रभाव अवश्य पड़ा है। परन्तु सूक्ष्म दृष्टि से देखने पर यह स्पष्ट परिलक्षित होता है कि कवि ने दिशा संकेत मात्र ही लिया है अन्यथा समग्र काव्य विन्यास कवि की अपनी मौलिक कल्पना का ही क्रिया कलाप है। जहाँ तक शक्ति के स्वरूप का प्रश्न है निराला द्वारा चित्रित शक्ति वह सार्वभौम शक्ति है जिसका विस्तार अनन्त में सर्वत्र फैला हुआ है। मायाशक्ति धारणी होकर भी वह देऊलि या प्रतिमा रूप में स्थापित मूर्ति नहीं है अपितु मानस विहारणी सर्वव्यापी शक्ति है, जिसका स्वयं-भूत आकार समग्र नभ को आच्छादित किए हुए है।

फिर देखी भीमा मूर्ति आज रणदेवी जो
आच्छादित किए हुए सम्मुख समग्र नभ को!
ज्योतिर्मय अस्त्र सकल बुझ बुझ कर हुए क्षीण
पा महानिलय उस तन में क्षण में हुए लीन।

(अपरा, राम की शक्तिपूजा)

जो अपनी मायाविनी शक्ति के बल पर अपने आश्रित की रक्षा हेतु उसके इष्ट साधनार्थ नाना रूप धारण करती है। महावीर हनुमान को हतवीर्य करने के लिए जो विकट आकार धारण करती है तथा क्षण भर में ही शिव का संकेत पा अन्जना रूप में परिवर्तित हो जाती है।

कृतिवास एवं माइकेल मधुसूदन दत्त की मान्यताओं के विपरीत निराला ने शिव को राम-पक्ष में एवं शक्ति को रावण-पक्ष में माना है।

उस ओर शक्ति शिव की जो दशस्कन्ध-पूजित
इस ओर रुद्र-बन्धन जो रघुनन्दन-कूजित।

यद्यपि रावण की शिव पूजा को वे भी स्वीकार करते हैं तथापि लोक हित नायक राम की ओर ही शिव-तत्व की स्थापना उन्हें अधिक अभीष्ट है। यहाँ वे मधुसूदन दत्त की अपेक्षा तुलसी के अधिक निकट हैं जो रावण पूजित शिव को भी राम का सर्वतोभावेन हितैषी मानते हैं :

सेवक स्वामि सखा सिय पी के।
हित निरुपधि सब विधि तुलसी के॥

(राम चरित मानस, बालकाण्ड)

सूक्ष्म पर्यवेक्षण से एक और विशिष्ट बात दृष्टिगोचर होती है वह यह कि रावण पक्ष-साधिनी शक्ति विवेकशून्य, अन्धी शक्ति है जो कार्य निष्पादन पर तो दृष्टि रखती है पर परिणाम की ओर उसका ध्यान नहीं जाता। वही जब शिव द्वारा उचित मार्ग का निर्देश पाती है तो जगत् हितकारी अम्बा के स्वरूप में परिवर्तित हो जाती है इसे हम निम्न पंक्तियों में स्पष्ट देख सकते हैं

....................हर मन्द्रस्वर
बोले "सम्बरो देवि निज तेज, नहीं बानर

यह-नहीं हुआ शृंगार-युग्म-गत, महावीर,
अर्चना राम की मूर्तिमान अक्षय शरीर······
× × × ×
विद्या का ले आश्रय इस मन को दो प्रबोध,
झुक जायेगा कपि, निश्चय होगा दूर रोध।
कह हुए मौन शिव, पवनतनय नें भर विस्मय
सहसा नभ नें अञ्जना रूप का हुआ उदय।

इस प्रकार निराला द्वारा मान्य शक्ति केवल इष्ट साधनी ही नहीं कल्याण कामिनी भी है। इतना अवश्य है कि वह अपने आराधक के प्रति अधिक कृपाशील है।

जहाँ तक राम द्वारा शक्ति के पूजन का प्रश्न है इसके लिए उन्हें (राम को) माइकेल मधुसूदन की उद्भावना के अनुरूप आकाशदर्शन या स्वप्न निर्देशन से प्रेरणा नहीं प्राप्त होती अपितु राम स्वयं शक्ति की कार्य प्रणाली का आभास कर लेते हैं और विश्व हितार्थ वे शक्ति के विरोध में युद्ध न छेड़ अपने मन से ही हार मानने लगते हैं। राम स्वयं अपने दुराक्रान्त मन की असमर्थता का कारण नहीं जानते। अन्याय के पक्ष में शक्ति का सहयोग भी उनके न्याय-प्रिय स्वभाव से परे की वस्तु जान पड़ता है। तभी तो वे विभीषण की जिज्ञासा पर स्पष्ट रूप से कहते हैं:—

·········मित्रवर, विजय होगी न समर;
यह नहीं रहा नर-वानर का राक्षस से रण,
उतरी पा महाशक्ति रावण से आमन्त्रण।

रणभूमि के अपने अनुभवों का जो विवरण श्री राम देते हैं उनके आधार पर यह स्पष्ट हो जाता है कि रण में आमूल परिवर्तन आ गया है। अब वह सामान्य भौतिक धरातल से ऊपर उठ चुका है। शक्ति की मोहन एवं जड़िमा कारिणी शक्ति से राम के हस्त सर-निक्षेपण में असामर्थ्य का अनुभव करने लगे हैं।

वस्तुस्थिति को पूर्णरूपेण समझने के पश्चात् जाम्बवान ने रण की इस नई दिशा का संकेत किया है। उन्होंने भौतिक युद्ध से राम को कुछ दिनों के लिए विरत रहने की सलाह दी तथा रण के इस उदात्त स्तर पर राम को संयत प्राणों के बल पर रावण के प्राणों (आसुरी) पर विजय पाने का प्रोत्साहन दिया—

आराधन का दृढ़ आराधन से दो उत्तर
तुम करो विजय संयत प्राणों से प्राणों पर।

इस स्थल पर हम स्पष्ट रूप से इस बात का आभास पाते हैं कि माइकेल मधुसूदन की कल्पना से निराला की कल्पना बहुत दूर पड़ती है। माइकेल ने भौतिक उपादानों का आश्रय अधिक लिया है और उनमें भी स्थूल मूर्ति-पूजा की पद्धति एवं पारम्परिक कथाओं का समावेश भी उन्होंने आस्था पूर्वक किया है। निराला क्रमशः भौतिकता की ओर से आध्यात्मिकता की ओर अग्रसर होते गए हैं। यहाँ तक कि एक स्थल ऐसा आता है जहाँ वे हमें भौतिकता से अत्यन्त पृथक् जान पड़ते हैं। वहाँ वे वैदिक वङ्मय में प्राप्त प्रतीकों के निकट दिखाई

पड़ते हैं। जिन आदि प्रतीकों से चलकर लोक धर्मी प्रतीकों का विकास लौकिक संस्कृत वाङमय से होता हुआ अधुनातम साहित्यों में हुआ; निराला जी पुनः प्राप्त आधुनातम उपादानों के सहारे उसी मूल तक पहुँचते हुए प्रतीत होते हैं। इसके लिए अपनी प्रसिद्ध कृति "तुलसीदास" की भाँति उन्होंने पुराने शब्दों में नए अर्थ नहीं भरे हैं अपितु पुराने शब्दों में आए परवर्ती अर्थ परिवर्तन के पर्दे को हटाकर पुनः उनके मूल अर्थों को ही पुनरुज्जीवित करने का यत्न उन्होंने किया है। इसी से "राम की शक्ति पूजा" में प्राप्त कई शब्दों के मूल अर्थों की पकड़ आवश्यक हो जाती है।

इनमें सबसे पहला शब्द है **शक्ति**। शक्ति का पूज्य रूप एक परवर्ती विकास है जो विशेष कर शाक्तों की देन है जिसके लिए कहीं आठ और कहीं नौ नामों का उल्लेख मिलता है। इनमें इन्द्राणी, वैष्णवी, शान्ता, ब्रह्माणी, कुमारी, नारसिंही, वाराही और माहेश्वरी नाम मुख्य हैं। अन्य स्थानों पर "शान्ता" के लिए 'चामुण्डा' और 'नारसिंही' के लिए 'चण्डिका' नाम का प्रयोग पाया जाता है। एक सम्प्रदाय "नव दुर्गा प्रकीर्त्तिता" के आधार पर शक्ति के नव नामों का उल्लेख करता है, वे हैं—वैष्णवी, ब्रह्माणी, रुद्री, माहेश्वरी, नारसिंही, वाराही, इन्द्राणी, कार्त्तिकी, और प्रधाना। इसके अतिरिक्त भी शक्ति के विभिन्न नामों एवं वर्गों का उल्लेख धार्मिक ग्रन्थों में मिलता है।

वायु-पुराण में बताया गया है कि रुद्र का एक अंश जो नारी का था; पुनः दो भागों में विभक्त हो गया जिसका आधा भाग सित और आधा असित था। सित अर्थात् श्वेत भाग से लक्ष्मी, सरस्वती, गौरी, और उमा की सृष्टि हुई तथा असित भाग से दुर्गा या काली की।

अब भी प्रायः शक्ति की उपासना इन नामों तथा इनके साथ कल्पित स्वरूपों में होती है इन सबके मध्य में शक्ति शब्द का मूल अर्थ ही प्रतिध्वनित है। जिसका तात्पर्य है क्षमता, बल, योग्यता, विक्रम आदि। शक्ति की पूजा इन अर्थों के सहारे आराधक से पृथक नहीं है। राम की शक्ति-पूजा शीर्षक में भी यह तथ्य व्यञ्जित होता है।

इसी से संपृक्त एक शब्द **शिव** भी है। शिव के लिए प्रायः रुद्र शब्द का पर्याय भी चलता है। प्रस्तुत रचना में एक ही साथ रुद्र और शिव दोनों का उल्लेख हुआ है। शिव स्वयं एकादश रुद्र हनुमान का परिचय शक्ति से कराते हैं। इससे स्पष्ट है कि यहाँ ये दोनों शब्द पर्याय मात्र नहीं हैं।

शिव—हिन्दू धर्म में मान्य सृष्टि की त्रिमूर्ति, ब्रह्मा, विष्णु और महेश में से तीसरे देव माने जाते हैं तथा सृष्टि पोषण और संहार के कर्तव्य-क्रम में वे संहार के देवता माने गए हैं परन्तु वेदों में संहार के देवता का नाम केवल **रुद्र** कहा गया है जो भयंकरता का प्रतीक है परन्तु पुराण युग से लेकर महाकाव्य-काल और परवर्ती शैवागमों तक आते-आते शिव भक्त शैव-सम्प्रदाय ने शिव को ही सर्वोत्तम देव की आख्या दे डाली, तथा सृष्टि स्थिति और संहार तीनों कर्मों के अधिष्ठाता के रूप में उनके ही तीन स्वरूप मान लिए। संहार के कार्य सम्पादन के अवसर पर उन्हें **काल** कहा गया तथा इस कार्य में उनकी पत्नी काली उनकी प्रधान सहायिका मानी गई। साथ ही उन्हें अर्द्धनारीश्वर की भी संज्ञा दी गई तथा उनके ही आधे अंग को पुरुष और आधे को नारी मान कर उन्हें सृष्टि के श्रोत का प्रतीक बताया गया।

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इसी प्रसंग में प्रस्तुत रचना के रुद्र शब्द का उल्लेख भी अनुचित न होगा। वेदों में रुद्र रितुओं के देवता कहे गए हैं। साथ ही उन्हें मरुतों और रूद्रों का पिता भी कहा गया है। संहार के देवता होने के कारण वे काल एवं अग्नि के अधिक निकट बताए गए हैं परवर्ती काल में शिव शब्द रुद्र के पर्याय के रूप में प्रयुक्त होने लगा और रुद्रों की पृथक रूप से कल्पना कर ली गई। उनकी संख्या भी एकादश या तैंतीस मान ली गई।

पौराणिक आख्यान के अनुसार रुद्र ब्रह्म के शिरोभाग से निकले माने जाते हैं और कहा जाता है कि बाद में उन्होंने अपने को नर-नारी के दो भागों में विभक्त कर लिया। नारी अंश के पुर्नविभागों का उल्लेख शक्ति के अंश में दिया जा चुका है। पुरुष अंश को उन्होंने पुनः एकादश रुद्रों में विभक्त किया। ये एकादश रुद्र पीछे चलकर शिव के ही व्यक्त उपरूप कहे गए। कहीं-कहीं रुद्र को दिग्पालों में भी गिना गया है; अन्यत्र रुद्र शिव के आठ भागों में से एक कहे गए हैं। परन्तु धात्वर्थ की दृष्टि से रुद्र शब्द भयानकता शोर, चिग्घाड़ आदि का द्योतक है, जब कि शिव शब्द, दयालु, कल्याण कारक, अनुकूल तथा जिसमें सभी वस्तुएँ स्थित हों, आदि का द्योतक है।

असुर—शब्द में अर्थ परिवर्तन अधिक हुए हैं। चूंकि निराला ने प्रस्तुत कृति में इस शब्द पर विशेष बल नहीं दिया है। अतः इसके अभीष्ट धात्वर्थ का संकेत मात्र ही उपयुक्त होगा। वेदों में यह शब्द प्राणवान, अवतारी या देवता अर्थ में प्रयुक्त हुआ है, पर साथ ही इसका प्रयोग कुछ दुष्ट प्रकृति वालों के लिए भी किया गया है (विशेष कर अदिति और कश्यप के पुत्रों के लिए) बाद में इसका अर्थ राक्षसों के लिए रूढ़ हो गया।

महिषासुर—महिष शब्द भी महान, पराक्रमी, बली अर्थ में प्रयुक्त होता है, साथ ही इसका एक अर्थ भैंसा भी है। दुर्गा द्वारा किसी अत्यन्त बली भैंसे को मारने की कथा में इसी उद्धत बलमर्दन का संकेत मिलता है।

रावण—राव का अर्थ है ध्वनि या शोर। रावण शोर करने वाले या चिल्लाने वाले को कहते हैं। विशस्रवा और केशिनी के पुत्र राक्षस-पति रावण का नाम भी अपने सौतेले भाई कुबेर (विशस्रवा और इलाविला के पुत्र) के द्वेष वश कैलाश उठाते समय अंगुलियों के दब जाने पर चिल्लाने के कारण ही पड़ा। बाद में इसी राक्षस-पति के नाम में ही इस शब्द का अर्थ संकोच हो गया।

राम—राम शब्द के अनेक अर्थ हैं; विशेषकर आनन्द देनेवाले या काले रंग वाले के अर्थ में इसका प्रयोग मिलता है। सुन्दर, प्रिय और चमत्कारपूर्ण आदि अर्थ भी इससे व्यंजित होते हैं। संज्ञा के रूप में परशुराम, राम और बलराम तीन का उल्लेख मिलता है। पर निराला का भी अभीष्ट **संज्ञा** के क्षेत्र में केवल दशरथात्मज रामचन्द्र से है।

इन शब्दों के अतिरिक्त **नयन, विदेह, जानकी** आदि शब्द भी श्लिष्ट हैं। इन शब्दों के प्रयोगों में निराला ने बड़ी सावधानी बरती है। उन्होंने लोक प्रचलित नामों तथा सम्बद्ध रूपों को कथा की गति के लिए पात्र रूप में ग्रहण किया है पर उनके मूल धात्वर्थों के प्रति वे अधिक सजग हैं तथा कथा का पूरा क्रिया कलाप उन्होंने इन्हीं धात्वर्थों के आधार पर खड़ा किया है। परिमाणस्वरूप कृति को आध्यात्मिक स्तर तक पहुँचाने में वे अत्यन्त सफल हुए हैं।

अर्चना की पद्धति पर दृष्टिपात करने से उनका आध्यात्मिक परिप्रेक्ष अधिक स्पष्ट हो जाता है। आराधना के लिए शक्ति का जो स्वरूप वे निर्धारित करते हैं उसमें यद्यपि वे दशभुजा, महिषासुरमर्दिनी, दुर्गा का उल्लेख करते हैं पर उसके जिस स्वरूप का संकेत करते हैं उसमें भौतिकता की अपेक्षा आध्यात्मिकता की ओर अधिक आकर्षण प्रतीत होता है :—

देखो, बन्धुवर सामने स्थित जो यह भूधर
शोभित-शत-हरित-गुल्म-तृण से श्यामल सुन्दर,
पार्वती कल्पना हैं इसकी, मकरन्द बिन्दु
गरजता चरण प्रान्त पर सिंह वह, नहीं सिन्धु
दशदिक समस्त हैं हस्त और देखो ऊपर,
अम्बर में हुए दिगम्बर अर्चित शशि-शेखर,
लख महाभाव-मंगल पदतल धँस रहा गर्व—
मानव के मान का असुर मन्द, हो रहा खर्व ॥

आराधना की प्रणाली भी उनकी योग-पद्धति पर चक्रों के भेदन के पश्चात् परम तत्व सहस्रार पर पहुँच कर सम्पूर्ण ब्रह्माण्ड विजय करने की है। आठ दिनों के दृढ़ समाराधन में राम क्रमशः (१) मूलाधार, (२) स्वाधिष्ठान, (३) मणिपूर, (४) अनाहत, (५) विशुद्ध, (६) आज्ञा चक्र, का भेदन करते हुए सहस्रार दुर्ग तक पहुचते हैं। अन्तिम क्षणों में प्रसिद्ध परीक्षा का अवसर दिखाकर (दुर्गा द्वारा एक इन्दीवर हटा लेने पर) राम की सर्वस्व-त्याग शक्ति का द्योतन भी बड़ी पटुता से कवि ने करा दिया है। जिसके परिणाम स्वरूप वहिवर्त्ती शक्ति भी अन्तवर्ती शक्ति से, विजय के दृढ़ निश्चय के साथ एकाकार हो जाती है।

"होगी जय, होगी जय, हे पुरुषोत्तम नवीन।"
कह महाशक्ति, राम के वदन में हुई लीन ॥

—o—

काशी में कर्नाटक-संगीत

श्रीरंगम आर० कण्णन

श्री कला संगीत भारती, कर्णाटक-संगीत विभाग

काशी और कर्नाटक संगीत में गहरा सम्बन्ध है। इतिहास से हमें मालूम होता है कि कर्नाटक संगीत की त्रिमूर्ति कहलाने वालों में से एक श्रीमुत्तुस्वामी दीक्षितर ने श्री चिदम्बरनाथ योगी नामक एक विद्वान् के साथ काशी जाकर पाँच साल तक हिन्दुस्तानी-संगीत के बारे में जानकारी प्राप्त की थी। अब भी काशी के हनुमान घाट, केदार घाट आदि स्थानों को देखने से हमें अनुभव होता है, जैसे हम दक्षिण भारत में हों। पुराने समय से ही ये दक्षिण भारतीयों के निवास स्थान हैं। जीवन के अंतिम दिन बिताने के लिए बहुत से लोग काशी आते हैं। दक्षिण के महाकवि श्री सुब्रह्मण्यम भारती ने अपनी कविता में काशी के महत्व को बताते हुए कहा है :—

"काशी नगर पुलवर पेशुम उरे तान कांचियिल
केट्पदरकोर करुवी शेयवोम"

इस पुण्य भूमि में, महामना पण्डित मदनमोहन मालवीय जी ने हिन्दू विश्वविद्यालय की स्थापना की, जो सारे संसार में प्रसिद्ध है। भारत में जितने प्रकार की विद्या, कला और भाषाएँ हैं उनको तो इस विश्वविद्यालय में स्थान प्राप्त है ही, इसके अलावा विदेशी भाषाएँ जैसे जर्मनी, फ्रांस, आदि देशों की भाषाओं, के पठन पाठन की भी यहाँ पूरी व्यवस्था है।

सन् १९५० में यहाँ 'श्रीकला संगीत भारती' के रूप में हिन्दुस्तानी संगीत-विभाग प्रारम्भ किया गया, जो इस समय सुचारु रूप से चल रहा है। इस विभाग में उच्चतम संगीत-शिक्षा के अतिरिक्त शोध-कार्य भी अत्यन्त द्रुत गति से हो रहा है।

हिन्दुस्तानी-संगीत के साथ साथ कर्नाटक संगीत की भी शिक्षा दी जाय, यह सभी अनुभव करते रहे हैं। सौभाग्य से जुलाई १९६४ से यहाँ कर्नाटक-संगीत को भी स्थान प्राप्त हो गया है। कर्नाटक-संगीत के विद्वानों और प्रेमियों का यह कर्तव्य है कि वे इस विभाग की प्रगति में हार्दिक सहयोग प्रदान करें।

हरिपाल देव के लिखे "संगीत-सुधाकर" नामक पुस्तक से यह मालूम होता है कि लग-भग ५०० साल पहले भारत में हिन्दुस्तानी-संगीत और कर्नाटक-संगीत में कोई भेद नहीं था। एक ही प्रकार का संगीत समस्त देश में प्रचलित था। उसी ग्रन्थ के आधार पर मालूम होता है कि मुगल साम्राज्य के समय ही दोनों पद्धतियों में अन्तर होने लगा। कर्नाटक संगीत में त्रिमूर्तियों के आने के बाद अधिकाधिक कृतियाँ प्रचार में आने लगीं। हिन्दुस्तानी संगीत की भाँति त्रिमूर्तियों के पहले कर्नाटक संगीत में भी रागालाप को ही विशेष स्थान दिया जाता था।

रागों के विषय में यदि देखा जाय तो बहुत से राग दोनों प्रकार के संगीत में मिलते-जुलते हैं। केवल उनमें नाम की ही भिन्नता है, अन्यथा आरोह-अवरोह तथा स्वरों में कोई

भिन्नता नहीं है। उदाहरणार्थ—कर्नाटक संगीत में कल्याणी, हिन्दोलम्, चक्रवाहम, पंतुवराली, सुपंतुवराली आदि रागों को हिन्दुस्तानी संगीत में यमन, मालकोस, भैरवी, पुरिया-धनाश्री और तोड़ी नामों से पुकारा जाता है।

कुछ लोगों के मन में यह भ्रम फैल गया है कि हिन्दुस्तानी-संगीत के विद्वानों को कर्नाटक-संगीत में अभिरुचि नहीं है। श्रुति-शुद्धता, विस्तृत राग, आलाप, वादी, सम्वादी स्वर इत्यादि हिन्दुस्तानी-संगीत के जो मूल तत्व हैं यदि कर्नाटक संगीत में भी उपर्यक्त बातों पर अधिक ध्यान दिया जाय तो यह निश्चित है कि हिन्दुस्तानी संगीत के विद्वानों को भी कर्नाटक संगीत में अभिरुचि उत्पन्न होगी।

कर्नाटक संगीत में हम लोग जो लय व्यवहार करते हैं उसे हिन्दुस्तानी-संगीत के विद्वान् बहुत पसन्द करते हैं। संगीत एक दैवी सम्पत्ति है जो जाति, धर्म आदि के भेदों से परे है। संगीत के द्वारा हम मोक्ष प्राप्त कर सकते हैं। संगीत में भक्ति भाव न हो तो मोक्ष प्राप्ति सम्भव नहीं। श्रीत्यागराजस्वामी का कहना है :—

"संगीत ज्ञानमु भक्ति विना सन्मार्गमु गलदे मनसा"

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EVALUATION OF THE CODE OF DISCIPLINE

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Background of the Code of Discipline

Pt. Jawaharlal Nehru, the main architect of the Economic Planning, for India, expected before independence that his dream of 'a progressive country' through Economic Planning might be realised After independence, the entire country's economy due to mass movement of population and poverty was found to be in a mess. He had to seek the people's co-operation to build the nation. The Planning Commission thus came into existence and the task of giving the country a new direction, a new vision, started since then. Policy for industrialising the country and uplifting the downtrodden through education, etc. was made and through the various agencies the work began. Alongwith the other factors of production labour was considered an important factor in development and a better deal to labour was also declared. This step was necessary to seek their day-to-day co-operation in maintaining harmony within the units. The main objective was to avoid the conflict and provide a smooth passage for the execution of the planned programme.

After the end of the First Plan period, the Government felt the need for more restrictive measures to curb the strikes and lockouts and to maintain peace. The man-days losses were gradually increasing due to conflict between labour and management. The Government was in search of a machinery through which co-operation of labour management could be ultimately achieved. The Central Government found out the 'way' and planned to implement the code of discipline inside the working of the unit. This idea of having a code of discipline was 'to put it as a morale booster' and to check the strikes, etc. on the moral grounds. The Government wanted this code to be passed by all the organisations (*tripartite*), so that it might

be successful in developing moral courage among the labour and management from the path of strikes and lockouts. Further, it was proposed that through the code of discipline, chances of mutual understanding between the labour and management would also increase. It was considered that the code would act as an instrument of imposing the objections and responsibilities on the employers and employees in the unit. Further, it was considered that the code would help in reducing the man-days losses and minimise the number of disputes in the unit. Thus, it was decided to carry out the 'productive drive' with greater zeal. It was further thought of that this would deter the work stoppages and help in the improvement of mutual understanding between the parties (i.e. employers and employees) and would give a "positive orientation to the Industrial Relations, basing them on the 'moral ethics' rather than on legal footings and prove to be preventive rather than punitive action."

Date of Birth

The idea of evolving a code of discipline was sponsored by the Central Ministry in the 15th session of the Tripartite Indian Labour Conference held at Delhi in July 1957. It became more pressing, as pointed out earlier, due to increasing rate of man-days losses, as compared to the preceding years. The man-days losses due to industrial disputes had risen from 5.6 million in 1955 to 7.0 million in 1956 as against an average of about 3.5 million during 1952 to 1954. So, Government, Central Employers Organisations and Central Trade Union Organisation became the party for framing the draft. In the Conference they took up the decision and it was prepared by the Tripartite Committee with certain principles of behaviour on the part of management and labour. It was then ratified in the next session of 16th Indian Labour Conference, and, thus, it came into effect from 1st June, 1958[1].

Machinery for Implementation of the Code

To implement the Code of Discipline, labour enactments, awards and agreements, and a separate machinery was set up

[1] Appendix—I Code of Discipline

at the Centre and in all the States. The implementation machinery has two wings, namely :

(i) implementation units in Labour Departments, and
(ii) Tripartite implementation committees at the Central, State and Local levels.

Under a Joint Secretary, the Implementation and Evaluation Committee in the Ministry of Labour and Employment has been created at the Centre and at the State levels. One whole-time officer under the Labour Commissioner (Labour Department) was appointed. The jobs assigned to the implementation units are to—

(i) ensure the implementation of various awards and the Code of Discipline,
(ii) and to help in the development of harmonious relations in the unit.

In order to achieve these objectives, various responsibilities are being assigned on the implementation units of the Labour Department as well as of the Tripartite Committees. To achieve these objectives, certain procedural steps to ensure better relations in the unit have been adopted ; namely,

(i) Preventive actions, through a vigilant eye on the troubled spots ;
(ii) Establishment of 'Grievance Procedure' with mutual consent of Employers and Trade Unions ;
(iii) To ensure the granting of recognition to the unions by the management, on satisfying the prescribed criteria ; and
(iv) To ensure that the sanctions are applied by the Central Organisations against their members found responsible for violations of the code, etc.

For the proper working of the code two important tools are also given by the Implementation Division in the hands of the workers and employers organisations i.e.,

(1) applying the sanctions against the defaulting members and (2) constitution of screening machinery to send only those cases for adjudication which are 'unavoidable'. Some of the

important recommendations made by the Standing Labour Committee (16th session—October 1957) and Indian Labour Conference (17th session—Madras—July 1959) are being laid down as a procedure for putting the pressure on the defaulting organisations in the country. These recommendations are given below :—

Sanctions

It was recommended that both the Central Organisations of the workers and the employers should apply the sanction to the erring members and see that they do not violate the code. The important part of recommendations were to disaffiliate the unit from its membership in case of persistent violations of the code, and not to give countenance, in any manner, to non-members who do not observe the code. In case of minor faults, suggestions were made to warn the members and demand explanation for the breach. These recommendations were to be carried out by the Central Organisations, failing which the spirit of the code was likely to be denounced.

Screening Machinery

Another step to put a check on the alarming number of disputes going for adjudication was the establishment of Screening Committees by the Central Organisations. It has been reported that Screening Committees at different places both by the workers and employers organisations have been formed, and it is the duty of the Implementation and Evaluation Division to ensure that these Committees function effectively in their spheres. In addition to these, a further obligation imposed on the Division is to take note of all the cases referred to the High Court or to the Supreme Court to check such cases, before they are referred to the high powered courts, are screened properly.

To be more exact and effective, the code did not leave even such unions and units which are outside the membership from the bigger organisations. It is considered essential that the implementation officers use their good offices to bring about the

settlement, as far as possible in all units where disputes arise. The code will be applicable equally to private as well as public undertakings. In addition to these, Implementation and Evaluation Division is to maintain the statistics of the cases tackled under the code and evaluate the cases which need proper attention. The Division is proud of its work on the evaluation done by it, and feels that evaluation studies will open new horizons in the field of labour relations. Some of the studies have been completed recently.

Achievements of the Code of Discipline

To assess the position and its working, the study has been bifurcated in two sections, viz., the achievements and assessments. They are as follows:

(A) Achievements

At the very outset it is clear that 'on principles the code of discipline is a sound and correct approach' to solve the evils of distrust and unrest arising in management and workers relations. This is more so, when the country is passing through economic crisis. External threats and internal price fluctuations have put severe strain on the working classes. Under such conditions, the code of discipline, code of conduct and Industrial Truce Resolutions seem as a right step to develop the sense of responsibility among the employers and employees. With this faith, the Implementation and Evaluation Division of the Labour Ministry is working and it is proud of its achievements on the reduction of man-days losses from 15.60 (in lakhs) in 1958 to 2.92 (lakhs) in 1963. Further in 1963, the Central Implementation and Evaluation Division received 2,383 complaints of the breaches of the code of discipline out of which 1,147 or 49% were dealt with by the State Implementation Machinery and 51% (1,236) by the Central Implementation Machinery. As the report further gives the details of the work, it is clear that pending cases during 1962 were reviewed and settled. The remaining 1333 cases were either endorsements or otherwise, which did not require any action by the Division.

TABLE NO. I

**Table showing the Comparative Position of Public and Private section During 1962-1963*

		No. of Complaints requiring action by the Division		Where Investigations were Completed: Not Substantiated on enquiry		Mutually Settled		Breaches brought to the notice of guilty parties or set right or dipute settled		Case under investigation.	
(Against Employers)											
Public	(100)	*1962*	*1963*	*1962*	*1963*	*1962*	*1963*	*1962*	*1963*	*1962*	*1963*
		108	203	34	70	16	21	18	34	40	78
		(100)	(100)	(31.0)	(34.4)	(15)	(10.3)	(17)	(16.8)	(37)	(38.5)
Private	(100)	628	886	131	180	66	99	161	252	270	355
		(100)	(100)	(20)	(20.3)	(10)	(11.3)	(27)	(28.4)	(43)	(40.0)
(Against Workers)											
Public	(100)	95	65	6	2	3	3	82	47	4	13
Sector		(100)	(100)	(6.3)	(3.0)	(3.2)	(4.6)	(86.3)	(72.4)	(4.2)	(20.0)
Private	(100)	136	179	17	9	7	13	88	127	24	30
		(100)	(100)	(12.5)	(5.1)	(5)	(7.3)	(65)	(70.6)	(17.5)	(17.0)

*Table : A review of the working of the Code of Discipline in Central sphere during 1962 and 1963 (Implementation and Evaluation Division).

(100) Indicates percentage.

From the table No. I, two hidden points are revealed. Firstly, with the passage of time, the code of discipline machinery is becoming popular, the testimony of which is the increase in the cases reported against the employers and employees in 1963 as compared to 1962. For example, the cases reported against employers in 1962 was 108, while in 1963 it went up to 203 in the public sector. In private sector, the number mounted from 628 to 886 during the same period. On the other hand, the cases reported against workers in private sector also has increased from 136 to 179 in 1963. Secondly, the effectivity of the machinery in tackling the cases reported to the Division also needs emphasis.

The report on the working of the Implementation Division clouds the success of the Code of Discipline in implementation of awards, agreements, labour laws, etc. Some important achievements in collieries are being cited to show how the management is being persuaded to bring settlement in their units.

Similarly, in other fields of unfair labour practices, recognition of unions, establishment of grievance procedure unilateral action, increase in work load, lockouts, etc. by the employers are being tackled by the Implementation Division or by employers organisation.

On the other hand, the cases of infringements by the workers too had been set right. For instance, in case of strikes during 1963, 170 cases of strikes 'including sit down and stay in strikes were reported. In ten cases of disputes leading to strikes were settled mutually and no responsibility could be fixed on any body. In 136 cases the reasons for the breaches were pointed out and erring unions were requested to avoid them in future.

Similarly, various other cases of unfair labour practices and unilateral actions, coercion, intimidation, rowdiness and violence, etc. by the workers were pointed out and attempts were made to minimise such activities.

Sanctions by Employers and Unions :

In addition to the working of the Implementation Division, the report has further appreciated the various steps like sanctions

against their members by Central Organisation, etc. which were taken up to reduce the frequency of unrest. But the report reveals that employers have not done every thing in the right spirit, in which they ought to have done, and so the trade union organiations.

Screening Machinery :

Another machinery provided under the code of discipline is named as 'screening machinery'. It is expected that this machinery will be provided by the Central Organisation which will try to settle their cases outside the court. The position of the activities, as reported, is as follows :—

The table no. II indicates the position where the various organisations stand utilising their screening machinery to settle the cases outside the court. It has been clearly indicated that while employers organisations have co-operated in the screening process, the Trade Unions particularly INTUC and AITUC did not supply the information to the Division, and a word has been added in the report that "Despite repeated requests, the INTUC and AITUC did not send information about the working of their screening machinery". So a wind of resentment is also there, although the Division is very hopeful that they will be actively associated in implementing the code procedures to build up an atmosphere of better relations.

Other Achievements :

Considering the other achievements of the Division, the most important of them is the various evaluation studies which have paved the way for disseminating the ideas in the masses. In 1963, the studies like-

(1) Labour-Management relations in Hindustan Housing Factory, Delhi ;

(2) Labour-Management relations in Hindustan Insecticides Ltd., Delhi ; and

(3) Labour-Management relations in Hindustan Machine Tools, Bangalore, etc. are being completed, which have proved to be an asset in the development of the ideas of better industrial relations in the unit.

TABLE No. II

**Table Showing the Working of the Screening Machinery of Central Employers' and Workers Organisations During 1962-1963*

	No. of cases screened		No. in which appeals were allowed by screening machinery		No. in which members accepted the advice of the screening machinery not to file appeal	
I. Employers *Organisations*	1962	1963	1962	1963	1962	1963
E.F.I.	26	24	21	22	5	2
A.I.O.I.E.	14	9	11	9	3	...
A.I.M.O.*	Nil	2	...	2	...	...
Total :—	40	35	32	33	8	2
II. Workers Organisations	1962[1]	1963[2]	1962	1963	1962	1963
I.N.T.U.C.	(1) Not available (2) Not supplied		...	...	...	...
A.I.T.U.C.	-do-		...	...	...	...
H.M.S.	Nil	8	...	5	...	3
U.T.U.C.	7	38	2	7	5	31
Total :—	7	46	2	12	5	34

*Information relates to the 1st half of 1963 only. Extract from the Report of the Working of Implementation and Evaluation Division (Ministry of Labour).

Assessment of the Working of the Code of Discipline :

(1) *Reduction in the Man-days Losses :*

The present Home Minister, the then Labour Minister, in 1961, claimed that the Code of Discipline has played an important role in reducing the man-days losses due to strikes, lock-outs, or absenteeism, etc. The figures given below also show the trend of reduction in the man-days losses from 1958 onwards.

TABLE No. III

Table showing the Position of Strikes and Man-Days lost in the units

Year	Total No. of	Men involved	Man-days lost	Percentage of disputes due to			
				Wages	Personal causes	Bonus	Other reasons
1958	1524	928566	7707585	34%	29%	11%	26%
1959	1531	693616	5633148	27%	25%	10%	38%
1960	1583	986268	6536577	36%	21%	13%	30%
1961	1357	511860	4918755	29%	27%	7%	37%
1962	1491	750590	6120576	30%	23%	12%	35%
1963	1394	457855	2901904	N.A.	N.A.	N.A.	N.A.

If the causes for the reduction of man-days losses are examined properly, three very important features are noticeable, which has no correlation with the Code of Discipline. They are (1) Establishment of wage boards and their awards, (ii) Rising prices, and (iii) Chinese threat. If the table given above is examined, one can see that the cause of disputes are mainly wages, bonus and personal (dismissal and discharges), etc. The Wage Board awards in important manufacturing disputes have given more relief to the workers and helped to reduce the strikes, etc.

In the years 1962 and 1963 prices went up very high and forced the workers to stick to their work as far as possible. As argued by the Employers of Kanpur Textile units the prices have compelled the workers to take their work more seriously than before. Loss of even one day may now result in putting more strain on their living than during normal times. Numerous strikes which would have been in the units, in the low price

level, will not be organised. The last aspect of the Chinese threat has developed a moral sense of unity and labour have pledged voluntarily to devote more time and to produce more. Thus, the sharp decline of disputes and man-days lost, cannot be claimed as a sole achievement of the code of discipline.

(2) *Moral Bindings on Workers & Management:*

The idea behind the Code of Discipline is to bind the management, workers with the moral obligations towards each other. They should settle their disputes themselves without resorting to strikes or lockouts. So far the ideal of moral binding is cocerned, there cannot be two opinions. But it has been found that State machinery in the name of adjustments failed to recognise the need to build strong unions and associations of the Labour and Management. In other words, if the Government had encouraged the formation of strong unions in the units, with the responsibility on their shoulders to see their own interest, and ultimately the interest of the country, better service would have been done. In the absence of a strong union in the industry and of enlightened management, the Code of Discipline is a misnomer rather than an asset. This has been accepted in the Twentieth Session of the Tripartite Labour Conference held from 7th to 9th August, 1962. It is said that "the working of the code has been interrupted by the frequent cases of refusal by the employers to (a) recognise unions and (b) agree to refer the disputes to arbitration. In the Conference, as a step to check the violation, the tripartite machinery has reiterated that "recognition is one of the basic ingredients of the Code, and failure to accord recognition to unions, which satisfies the criteria for such recognition as laid down in the Code, should be considered a serious violation of the Code".

On the other hand, in case of reference to the 'arbitration' emphasis was that readiness to refer dispites to arbitration is an important requirement of the code. The refusal to agree to arbitration must be fully explained by the party concerned in each case and the matter brought up for consideration by the Implementation machinery concerned".

To make the code more effective it has been desired that 'SOS' message should be sent to the Minister when all the avenues fail to bring the settlement.

Posing for the remedy as referred to earlier, and not giving what is due to the Labour and Management, gives trouble in achieving the goals of better relations in the unit. This has been proved beyond doubt and the present position in the units, as revealed through the surveys conducted by the institutions and individuals reveals and also suggests that :

1. the Code of Discipline has not created an impression on the minds of Trade Unionists, workers and managements in the units, that it is an instrument through which better relations can be achieved. The reasons are the lack of knolwedge and half hearted acceptance of the Code by the Central and State Organisations. On enquiry, answers of workers, in this respect, are- "Not Known". This is particularly due to lack of drive at the local points where the trouble is apprehended. Implementation Division wants voluntary dealings of the management and unions without basically following the policies at the gate. As said earlier, there is a problem of strong union in the unit which could guide their workers. On the contrary, union rivalry and local politics consume their time, that affects the unit and the industry at large under these circumstance and high ideals remain '*ideals*' only. It is said that union and union membership are on increase, and so the popularity of workers and strength of unions are on increase. This cannot be the criterion for judging their popularity and effectiveness. The unions are weak and rivalry and frictions are more, so the code at present can be more effective through them. This is made more clear from the stand taken up by the two major unions of INTUC and AITUC who have refused to co-operate in screening and applying sanctions on their own members. It is a sign that suggests they do not have faith in their own effectivity. Thus, they fail to see how code can be implemented. This is more clear from the Memorandum of INTUC which is sent on December 28th, 1964 to the Planning Commission, alleging

that "The code of discipline has not proved effective because many public sector undertakings including the railways had not yet subscribed to it. ....". It went one step further in saying that "There is no use sermonising the people to be honest as long as dishonesty prevails".

Similarly, AITUC in their annual meetings have categorically declared the idea of 'Code of Discipline' as a process to stop the growth of unionism in the industries. The policy of State is to befool the workers and to give in return the code of conduct and code of discipline. The recomendations to disaffiliate to the violating unions.

Role of the Implementation and Evaluation Division:

It has been criticised by some independent thinkers and writers that the service rendered by the Division is more of an academic nature, and as such, it provides indirect help in the solutions of the problems. So far as this function is concerned, the Division has proved successful, but for utilising these studies for peaceful solutions of the disputes it has its own limitations. The present day workers, particularly as seen in old industrial centres, are quite conscious of their own rights and obligations. They, as the T. L. A. of Ahmedabad General Secretary Mr. S. M. Seikh has put it, say that "they do not behave in low efficiency, less production and deliberate go-slow tactics in the unit". They feel that they are the partners of the unit. But management should also feel and take to their hearts that workers do not want destruction. The path of voluntary conciliation and voluntary arbitration, as shown by Mahatma Gandhiji, are followed by them, and Mr. Sheikh argued further that "if the Code of Discipline could give any thing more than this, we would like to have it".

So, the Division, in the implementation of the Code, should find out more realistic approach rather than doing a 'job' which leaves ground for doubts.

Points to Ponder:

The implications of the Code of Discipline needs thorough examination before a guarded remark of failure or success can

be given to it. Various issues like the development of Trade Unionism, workers right to strike for their demands, wages and security of service, joint consultations, at the plant level and negotiations and mutual co-operation are to be examined and with them the possible relation between the principles of Code of Discipline are to be established. The openings will pave the way for the success of the Code of Discipline. Each aspect needs consideration spearately on various grounds. They are given below :—

(1) Union Consciousness in the Unit :

Workers in the unit have to be union-conscious for the solidarity and progress. The prevalence of rivalry, backed by political motivation will hinder in the proper observance of the Code of Discipline, by the unions and their members. Managements' outlook does not change, which always try to protect their ponny at any cost so long they can get it with ease, they will like to have it. There primary objective is the recognition of the union and development of consciousness in the unit for the implementation of the Code of Discipline.

(2) Right to Strike :

'Strike and Lockout' are bad for any industry in the sense that they encourage bitterness and bring distress to both the management and workers. But to snatch the right to strike by legal ordinances and to put such a machinery which gives judgement after a prolonged procedure, cannot be appreciated by the workers and trade unions. If the democracy is to survive, the right to act and to resist unjust acts needs careful thought. If the Code of Discipline is in lieu of the 'right to strike', it will never gain ground and ultimately it has to be abondoned by all the Central and State organisations. The signs are there and threats by unionists have started forthcoming on its shortcomings.

(3) Wages and Security for the Service :

From the studies conducted by the Department of Commerce, Banaras Hindu University, it has been established that the

minds of the working force will be governed in the near future by the ideas of better wages and security of service. A study on the all-India pattern, conducted by the author, in cotton textile units reveals, region-wise, two features, viz.,

(1) Where the union is strong the percentage of retrenchement and the number of temporary workers are less, and

(2) Where the union is weak or the union leadership is poor, more than fifty per cent workers are temporary and their voice is negligible.

So it happens that Code of Discipline under these cases will fail to bind the people or organisation to resist the temptation of creating the unrest amongst the people. It is not that the labour is uneducated and as such they do not understand the meaning of the codes ; they do understand it and if investigation is conducted they feel all these have no correlation from their day to day activities.

(4) *Negotiations and Mutual Understanding :*

The aim of the Code of Discipline is to create an atmosphere of mutual negotiations and mutual understanding. This needs more careful consideration in view of the 'compulsory' nature of legislations existing in the country. The champion of voluntary arbitration and conciliation, Shri V. V. Giri, still believes in experiments in the voluntary negotiations. But the point is whether the government feels like doing it now ? If so, then the Code has considerable scope for its acceptance.

(5) *Labour-Management Relations :*

Under the banner of Labour-Management Relations two aspects need careful study, viz., developmet of the idea of 'Partnership' in the unit and joint consulatations at each level of the plant. Leaving few units, which have developed standing agreement with their unions or formed some of the councils or committees or following the Industrial Disputes Act or the Standing Orders, others claim that workers are consulted at each level. Thus, a sense of partnership has

developed. There too, it is necessary to see whether the Gode of Disscipline is observed in the true sense. One has to be very much penetrating to give the point in favour or against it.

(6) *Implementation and Evaluation Division :*

The Implementation and Evaluation Division working as a part of Ministry of Labour has to develop its own area of operation. Unless there is a faith in the 'system' of observance of the Code, the machinery may not be able to render the service efficiently and in proper form. Limitations need careful study and the machinery has to popularise its activities, not on academic plane only but up to the workers' level. It is useless to say that management and unions only should popularise the functions and help themselves in restraining from the bad designs or outbursts.

These six points need examination before arguing the case of the Code of Discipline and its successful implemntation. In brief, it can be said that the following points are to be properly taken into consideration for its successful implementation and functioning.

(1) Proper development of Trade Unions in the unit.
(2) Impartial and compulsory recognition of the Union by management both in the public and private sectors.
(3) Attempts may be made to create confidence among the workers through educational and training programmes.
(4) A systematic motivating forces need employment to build a moral force.
(5) To make the code effective, the approach at the unit or units level has to be made rather than at the Central Organisations.
(6) In implementing the 'Code' unions have to think other than political prestige.

संस्कृत शिक्षा-प्रणाली

पं० विश्वनाथ शास्त्री
संस्कृत महाविद्यालय

भारत की शिक्षा-प्रणाली अपना पृथक् अस्तित्व रखती है। विश्वविद्यालयीय शिक्षा का प्रारम्भ यहाँ तीन मार्गों द्वारा हुआ है। सर्वप्रथम ब्राह्मण-संस्कृति का, जिसे हम वैदिक-संस्कृति भी कहते हैं, प्रारम्भ हुआ। सिन्धु-घाटी की सभ्यता के समय से अथवा उसके कुछ पहले से ही इसका प्रारम्भ माना जा सकता है। दूसरी शिक्षा-परम्परा का प्रारम्भ मुगल-काल से होता है। मुसलमानों के आक्रमण से भारतीय संस्कृति पूर्णतः प्रभावित हुई, उससे यहाँ के सामाजिक जीवन, शिक्षा-दीक्षा, आचार-व्यवहार सभी में व्यापक परिवर्तन हुए; परिणामस्वरूप शिक्षा-प्रणाली भी परिवर्तित हुई। कुछ दिनों के बाद जब भारत में अंगरेजों का आगमन हुआ, तो भारतीय शिक्षा-प्रणाली में नया मोड़ आया। वर्तमान समय में प्रचलित शिक्षा-प्रणाली, यूरोपियन विचार-धारा एवं शिक्षण-परम्परा से पूर्णतः प्रभावित है। इस प्रकार तीन प्रकार की शिक्षण-परम्पराएँ भारत में विभिन्न समयों में विकसित हुईं; उन तीनों का सम्मिलित प्रभाव आज देखने में आता है। अतएव तीनों का यथाक्रम विवेचन यहाँ विधेय है।

वेद अनन्त ज्ञान-विज्ञान के भाण्डार हैं। चारो वेदों में भी "ऋग्वेद" अत्यन्त प्राचीन माना जाता है। ऋग्वेद की एक ऋचा में प्राचीन काल की गुरुकुल प्रणाली का चित्र उपस्थित किया गया है। उसमें आश्रम में पढ़ने वाले शिष्यों की तुलना वर्षाऋतु में एकत्र होनेवाले उन पक्षियों से की गई है, जो परस्पर की आवाज को दुहराते हैं। व्यक्ति के जीवन की औसत आयु १०० वर्ष मानकर उसे चार भागों में बाँट दिया गया। जन्म के बाद २५ वर्ष तक की अवस्था को "ब्रह्मचर्य आश्रम" २५ से ५० तक की अवस्था को "गृहस्थ आश्रम" ५० से ७५ वर्ष तक की अवस्था को "वानप्रस्थ आश्रम" ७५ से १०० वर्ष तक की अवस्था को "सन्यास आश्रम" की संज्ञा से अभिहित किया गया है। बालक को आठ वर्ष की अवस्था में ही यज्ञोपवीत करके गुरु के समीप विद्याध्ययन के लिए भेज दिया जाता था। वहाँ जाकर विद्यार्थी, क्रम से वेद एवं शास्त्रों का अध्ययन करता था।

शिक्षा की दृष्टि से प्रथम आश्रम ही महत्त्वपूर्ण है। इसी आश्रम में विद्याध्ययन करने का विधान किया गया है। प्रमुख रूप से वेद का अध्ययन ही सबसे पहले कराया जाता था। प्रत्येक द्विजाति को वेदाध्ययन का अधिकार था। गुरु के समीप जाकर रहस्य के सहित वेद के अध्ययन का विधान मिलता है। वेद के तीन भाग माने जाते हैं— (१) मंत्रभाग (२) ब्राह्मण भाग (३) उपनिषद् भाग। मंत्रभाग में विभिन्न देवताओं एवं यज्ञ-यागादिकों के मंत्र मिलते हैं। ब्राह्मण भाग में उन्हीं वैदिकमन्त्रों की विस्तार से व्याख्या की गई है। उपनिषद् को वेद का ज्ञानकाण्ड भी कहते हैं। इसमें ब्रह्म एवं आत्मा सम्बन्धी उच्च विचार मिलते हैं। "रहस्य[1]" का तात्पर्य उपनिषद् से ही है। ये ही वेद

के तीन विभाग हैं; प्रत्येक छात्र को सर्वप्रथम इसका अध्ययन कराया जाता था। वेदाभ्यास तो ब्राह्मणों का तप ही माना जाता है।[२] जब तक मंत्र-ब्राह्मण क्रम[3] से विद्यार्थी का उपनयन संस्कार न हो जाय, तब तक वेद का अध्ययन वह नहीं कर सकता था। शास्त्रों में बतलाया गया है कि गुरु को पूर्वाभिमुख तथा शिष्य को पश्चिमाभिमुख होकर अध्ययन-कर्म में प्रवृत्त होना चाहिए।[४] किस महीने में, किस तिथि को एवं दिन के किस भाग में कौन सा शास्त्र पढ़ना चाहिए, इसकी भी चर्चा शास्त्रों में विस्तार के साथ की गई है।[५] गुरु को धार्मिक तथा निरामय होना चाहिए। गुरु के लिए यह उचित है कि वह अपने शिष्य को उसी भाषा में शिक्षा प्रदान करे, जिसे वह सरलता से समझ सकता हो—चाहे वह संस्कृत हो, चाहे देशभाषा हो, अथवा प्राकृत हो।[६] गुरु को चाहिए कि वे सर्वप्रथम स्वर्गादि-साधक वेदों का अध्यापन करें, तत्पश्चात् उसके अंगों को पढ़ावें। बाद में इतिहास, बालतंत्र, भूततंत्र, ज्योतिष, वैद्यक एवं काव्यशास्त्र की शिक्षा प्रदान करें।

गृहस्थ आश्रम में ब्रह्मचारी कब प्रवेश करे, इसका काल-निर्णय करते हुए गृह्य-सूत्रों में बतलाया गया है कि वेद का अध्ययन समाप्त करने के बाद ही स्नान (समावर्तन) करना चाहिए।[७] जब तक वेद का अध्ययन पूर्णतया समाप्त न हो जाय, तब तक ब्रह्मचारी को गृहस्थ धर्म में प्रविष्ट होना उचित नहीं है।

वेदाध्ययन के अन्तर्गत वेद शब्द से विधि, विधेय और तर्क तीनों का ग्रहण होता है।[८] विधि के विधायक ब्राह्मण हैं, और मंत्र ही विधेय हैं। तर्क शब्द से अर्थवाद (मीमांसा शास्त्र) का ग्रहण होता है। इस प्रकार विधि, अर्थवाद और मंत्र तीनों का ग्रहण "वेद" शब्द से होता है।[९] कुछ आचार्य वेद के षडंगों---शिक्षा, कल्प, व्याकरण, निरुक्त, छन्द और ज्योतिष—का ग्रहण भी "वेद" शब्द से करते हैं। उनका मत है कि केवल वेद ही नहीं, वेद के इन अंगों का भी अध्ययन करने के अनंतर समावर्तन संस्कार करना उचित है।[१०] यहाँ स्नान करने अथवा समावर्तन करने से तात्पर्य द्वितीय आश्रम में प्रवेश करने से है।[११] इस प्रकार प्रमुखतः तीन पक्ष दिखाई पड़ते हैं। मंत्रब्राह्मणात्मक वेद का अध्ययन करके स्नान करे, यह एक पक्ष है। अंग सहित वेद का अध्ययन करके स्नान करे, यह द्वितीय पक्ष है। ग्रंथमात्र का अध्ययन करके एवं विभिन्न यज्ञादिकों का अभ्यास करने के अनंतर स्नान करे, यह तृतीय पक्ष है।[१२] तीसरा पक्ष याज्ञिकों के लिए ही है, वे बिना षडंग का अध्ययन किए ही, यज्ञादिकों का अभ्यास करने के अनंतर, गृहस्थाश्रम में प्रविष्ट हो सकते हैं। किन्तु जिसने ग्रंथमात्र का तो अध्ययन कर लिया है, किन्तु यज्ञ-विद्या का अध्ययन नहीं किया है वह स्नान करने (गृहस्थाश्रम में प्रविष्ट होने) का अधिकारी नहीं है।[१3] इसका कारण यह है कि वेदाध्ययन का प्रयोजन वेदविहित अग्निहोत्रादि कर्म का अनुष्ठान करना ही है।[१४]

हमारे यहाँ चौदह विद्या-प्रस्थान माने जाते हैं। इनके अन्तर्गत चारो वेद, उनके छः अंग, पुराण, न्याय, मीमांसा और धर्मशास्त्र की गणना की जाती है।[१५] कुछ लोग आयुर्वेद, धनुर्वेद, गान्धर्ववेद और अर्थशास्त्र को भी पृथक् विद्या-प्रस्थान मानते हैं। इनको लेकर १८ विद्या-प्रस्थान हो जाते हैं।[१६] पुराण, न्याय, मीमांसा और धर्मशास्त्र को वेद का "उपांग" माना जाता है। उप-पुराणों का समावेश पुराणों के अन्तर्गत कर

लिया गया है। वैशेषिक-शास्त्र का अन्तर्भाव न्याय में, वेदान्त का अन्तर्भाव मीमांसा में, महाभारत, रामायण, सांख्य एवं पातंजल योग, पाशुपत एवं वैष्णवादि मतों का अन्तर्भाव धर्मशास्त्र के अन्तर्गत किया जाता है। यद्यपि सांख्यादि दर्शनों का भी अन्तर्भाव धर्मशास्त्र में कर लिया गया है, तथापि इन्हें पृथक् ही रखा गया है। आस्तिकों के मतानुसार यही १८ विद्या प्रस्थान माने जाते हैं। नास्तिकों के मतानुसार ६ विद्याप्रस्थान और हैं। माध्यमिक, योगाचार, सौत्रान्तिक और वैभाषिक के चार मत तथा चार्वाकों का "देहात्मवाद" और दिगम्बरों का देह से अतिरिक्त "देह-परिणामवाद", नास्तिकों के ये ही छः विद्या-प्रस्थान हैं। इसके अतिरिक्त अर्थशास्त्र भी कई होते हैं। अर्थशास्त्र में नीतिशास्त्र, अश्वशास्त्र, गजशास्त्र, शिल्पशास्त्र, सूपकारशास्त्रादि की गणना होती है। इन शास्त्रों के अतिरिक्त ६४ कलायें भी हैं जिनका ज्ञान कराया जाता है।[१७] अनेक देशों की भाषा को जानना, जिसे हम "देशभाषा-विज्ञान" कहते हैं, ६४ कलाओं के ही अन्तर्गत है।[१८] इन विद्याओं के पृथक्-पृथक् अधिष्ठातृ देवता भी बतलाए गए हैं।

विद्या-भेद से श्रुति भी दो प्रकार की मानी जाती है। एक को "परा" कहते हैं, और दूसरी को "अपरा"। जिस विद्या के द्वारा ब्रह्म-सम्बन्धी ज्ञान होता है, उसे "परा" विद्या कहते हैं। समस्त वेद, उपवेद, पुराण, उपपुराण आदि की गणना अपरा विद्या के अन्तर्गत की जाती है।[१९] इस प्रकार उपर्युक्त शास्त्रों की चर्चा हमारे शास्त्रों में मिलती है। इनके पठन-पाठन का भी पृथक् विधान है। चौलकर्म करने के अनन्तर विद्यार्थी को सर्वप्रथम "लिपि" (लिखना) और "संख्या" (गणित) की शिक्षा प्रदान करनी चाहिए।[२०] उपनयन के अनन्तर त्रयी तथा आन्वीक्षिकी की शिक्षा देनी चाहिए।[२१] दिन के पूर्वभाग (पूर्वाह्न) में हस्ती, अश्व, रथ एवं प्रहरणविद्या का तथा अपराह्न में इतिहास-श्रवण, पुराण, धर्मशास्त्र, अर्थशास्त्र का अध्ययन करना बतलाया गया है। दिन और रात्रि के शेष भागों में जिनका ग्रहण पहले न किया गया हो, उनका अध्ययन तथा जिनका परिचय प्राप्त कर लिया गया है, उनका अभ्यास करना चाहिए।[२२] शास्त्रों के अध्ययन का यही प्राचीन क्रम है।

वैदिकप्रणाली के अनन्तर भारत में एक दूसरी शिक्षण-परम्परा विकसित होने लगी, जिसका परिचय हम बौद्धों के यहाँ करते हैं। बौद्धों ने अपने समय में शिक्षा के प्रसार के लिए कई विश्वविद्यालयों की स्थापना की, जिसमें नालन्दा, तक्षशिला और उज्जैन के विद्यापीठों का नाम उल्लेखनीय है। बौद्धों के यहाँ शिक्षा प्राप्त करने में किसी प्रकार का बन्धन नहीं था। समाज के प्रत्येक क्षेत्र के व्यक्ति शिक्षा ग्रहण कर सकते थे। इन विश्व-विद्यालयों में निम्नलिखित पाँच विषयों का अध्यापन प्रमुख रूप से कराया जाता था— (१) व्याकरण (२) कला (३) आयुर्वेद (४) तर्कशास्त्र (५) दर्शनशास्त्र। इन विश्व-विद्यालयों में वाद-विवाद करने एवं परस्पर स्वतन्त्र रूप से विचार विनिमय करने की पूर्ण स्वतन्त्रता थी।

मुसलमानों के आगमन के बाद भारत में नयी शिक्षा-प्रणाली का आगमन हुआ, जो पूर्णतः इस्लामधर्म से प्रभावित थी। इस काल में मदरसों में शिक्षा प्रदान की जाती थी। फारसी भाषा में ही शिक्षा प्रदान की जाती थी। इनमें केवल मुस्लिम छात्र ही

प्रविष्ट हो सकते थे। पर बाद में फारसी जन-साधारण एवं कार्यालयों की भाषा बनी। मुसलमानों के आगमन के पश्चात् भारतीय और इस्लाम संस्कृति का परस्पर मेल-मिलाप हुआ, जिसके परिणाम स्वरूप उर्दू भाषा बनी, जिसमें अरबी-फारसी और संस्कृत तीनों के भाषागत तत्त्व मिलते हैं। यह स्थिति अकबर के शासनकाल तक बनी रही। कुछ समय बाद भारत में पुनः एक नयी शिक्षण-परम्परा का आगमन हुआ, जो यूरोपियन मिशनरियों की स्थापना के साथ ही भारत में फैलने लगी। इन मिशनों की स्थापना अंगरेजों ने भारतीय जनता के सामाजिक एवं बौद्धिक जीवन में परिवर्तन करने के लिए की थी। यूरोपियन आदर्शों के अनुकूल भारत में विश्वविद्यालयों की भी स्थापना की गई। सर्वप्रथम बम्बई, कलकत्ता और मद्रास में विश्वविद्यालय खुले। इनमें शिक्षा प्रदान करने का माध्यम अंग्रेजी भाषा थी। लन्दन में स्थित विश्वविद्यालयों के अनुकूल ही इन्हें भी निर्मित किया गया था। प्रारम्भ में इनमें कला से सम्बन्धित विषय पढ़ाए जाते थे, बाद में पाश्चात्य आयुर्वेद, विज्ञान तथा इंजिनियरिंग की भी पढ़ाई होने लगी। आज हम भारत में जिस अध्ययन-परम्परा को पाते हैं वह इसी यूरोपियन शिक्षा प्रणाली से विकसित हुई है। प्राचीन शिक्षा-प्रणाली लुप्त होती जा रही है। आवश्यकता इस बात की है कि हम अपनी प्राचीन शिक्षा-प्रणाली और उससे सम्बन्धित शास्त्रों का अध्ययन लुप्त न होने दें।

समाहार रूप से सरकार को, संस्कृत शिक्षा प्रणाली के उन्नयन, प्राचीनशास्त्रों के संवर्द्धन एवं उनके यथोचित प्रचार के लिए निम्नलिखित व्यवस्था करनी चाहिए।

(१) विद्यार्थियों को ५ वर्ष की अवस्था से २५ वर्ष की अवस्था तक अनिवार्यतः शिक्षा प्रदान की जाय।

(२) माध्यमिक-शिक्षा तक प्रत्येक छात्र को निःशुल्क शिक्षा प्रदान करने की व्यवस्था हो।

(३) संस्कृत के प्राचीन ग्रन्थों के वैज्ञानिक सम्पादन की व्यवस्था की जाय जिससे लुप्त होते हुए शास्त्रों का संरक्षण किया जा सके।

(४) संस्कृत शिक्षण की व्यवस्था माध्यमिक कक्षा तक पूरे भारतवर्ष में अनिवार्य कर दी जाय।

(५) शिक्षण का माध्यम प्रत्येक प्रान्तों की मातृभाषा हो।

(६) संस्कृतभाषा के लिए सर्वत्र देवनागरी लिपि का प्रयोग हो।

(७) प्रान्तीय एवं केन्द्रीय विश्वविद्यालयों का निर्माण गुरुकुल प्रणाली के आधार पर हो जिनमें उक्त १८ विद्याओं का अध्यापन हो।

(८) प्रत्येक प्रान्त में संस्कृत विश्वविद्यालय स्थापित किए जायँ।

(९) माध्यमिक शिक्षा तक वेद, स्मृति (धर्मशास्त्र) वेदांग, संस्कृत साहित्य, गणित एवं किसी एक अन्य प्रान्तीय भाषा का प्रौढ़ ज्ञान हिन्दी माध्यम के साथ कराया जाय।

(१०) पाठ्यक्रम में चरित्र, आचार तथा शारीरिक प्रशिक्षण अनिवार्य हों।

(११) प्राचीन विद्या के संरक्षक विद्वानों के सम्मान तथा संरक्षण की पूरी व्यवस्था हो।

उद्धरण

१—"तपोविशेषैर्विविधैर्व्रतैश्च विधिचोदितैः ।
वेदः कृत्स्नोऽधिगन्तव्यः सरहस्यो द्विजन्मना ।" मनु० २।१६५

२—"वेदाभ्यासो हि विप्रस्य तपः परमिहोच्यते ।" मनु० २।१६६

३—"समिधमाधेहि दिवा मा स्वाप्सीः ।" (गृ० सू० १।२२।६, १।२२।२)

४—"प्राङ्मुखो गुरुरासीनो वरुणाभिमुखं शिशुम् ।
अध्यापयेच्च प्रथमं द्विजाशीर्भिः प्रपूजितम् ।"

५—"श्रावण्यां प्रौष्ठपद्यां वाऽप्युपाकृत्य यथाविधि ।
युक्तश्छंदांस्यधीयीत मासान् विप्रोऽर्धपञ्चमान् ।
पुष्ये तु छन्दसां कुर्याद् बहिरुत्सर्जनं द्विजः ।
माघशुक्लस्य वा प्राप्ते पूर्वाह्णे प्रथमेऽहनि ।"
अत ऊर्ध्वं तु छन्दांसि शुक्लेषु नियतः पठेत् ।
वेदाङ्गानि च सर्वाणि कृष्णपक्षेषु सम्पठेत् ।।
यथोदितेन विधिना नित्यं छन्दस्कृतं पठेत् ।
ब्रह्मछन्दस्कृतं चैव द्विजो युक्तो ह्यनापदि ।।" मनु ४–९५, ९६, ९८, १००

६—"संस्कृतैः प्राकृतैर्वाक्यैर्यः शिष्यमनुरूपतः ।
देशभाषाद्युपायैश्च बोधयेत् स गुरुः स्मृतः ।"

७—"वेदं समाप्य स्नायात् ।" पा० गृ० २।१

८—"विधिर्विधेयस्तर्कश्च वेदः ।" पा० गृ० सू० २।१

९—"विधिर्विधायकं ब्राह्मणम् । विधेयाः मन्त्राः । तर्कशब्देनार्थवादोऽभिधीयते ।
तेन विध्यर्थवादमंत्रान् वेदशब्देनाभिधीयन्त इत्युक्तम् ।" पा० गृ० सू०

१०—"षडङ्गमेके शिक्षा कल्पो व्याकरणं निरुक्तं छन्दो ज्योतिषमिति षड्भिरङ्गैरुपेत वेद आचार्याः वेदमिच्छन्ति । एतस्मिन् अधिगते स्नानार्हो भवति ।"

११—"स्नानं च द्वितीयाश्रमप्रतिपत्तिः । तदनुष्ठानयोग्यता च षडङ्गे वेदेऽधिगते भवति ।" पा० गृ० सू० १

१२"—मंत्रब्राह्मणात्मकं वेदमधीत्य अवबुध्य च स्नायादित्येकः पक्षः । साङ्गं वेदमधीत्यावबुध्य च स्नायादित्यपरः । ग्रन्थमात्रमप्यधीत्य यज्ञविधां चाभ्यस्य स्नायादिति तृतीयः ।" पा० गृ० सू० १

१३—"यज्ञविद्याविरहेण ग्रंथमात्रे अधीते न स्नायादिति निषेधः ।"

१४—"यतो वेदाध्ययनस्य वेदविहिताग्निहोत्रादिकर्माद्यनुष्ठानप्रयोजनम् ।"
पा० गृ० सू० हरिहर भाष्य पृ० ३३९

१५—"पुराणन्यायमीमांसाधर्मशास्त्रांगमिश्रिताः ।
वेदाः स्थानानि विद्यानां धर्मस्य च चतुर्दश ।" याज्ञ० स्मृति०

अंगानि वेदाश्चत्वारो मीमांसा न्यायविस्तरः ।
धर्मशास्त्रं पुराणं च विद्याह्येताश्चतुर्दश ॥

१६—"आयुर्वेदो धनुर्वेदो गान्धर्वश्चेति ते त्रयः ।
अर्थशास्त्रं चतुर्थं च विद्याह्यष्टादशैव ताः ।" विष्णुपुराणम्

१७—"अर्थशास्त्रं च बहुविधम् । नीतिशास्त्रम्—अश्वशास्त्रम्—गजशास्त्रम्, शिल्प-शास्त्रं सूपकारशास्त्रं चतुःषष्टिकलाशास्त्रं चेति ।

१८—"देशभाषाविज्ञानम् कलास्वेव पठ्यते ।"

१९—"श्रुतौ तु विद्याभेदः द्विविधः पराऽपराभेदादुक्तः । यया ब्रह्मागमः साऽपरा । ययाऽक्षरमधिगम्यते सा परेति श्रुतेः । ऋग्वेदादिलक्षणा अपरा, सा चाध्ययनाध्यापनरूपा ।"

२०—"वृत्तचौलकर्मा लिपिं संख्यानं चोपयुञ्जीत ।"

२१—"वृत्तोपनयनस्त्रयीमान्वीक्षिकीं च शिष्टेभ्यः । वार्तामध्यक्षेभ्यः । दण्डनीतिं वक्तृप्रयोक्तृभ्यः ।"

२२—"पूर्वमहर्भागं हस्त्यश्वरथप्रहरणविद्यासु विनयं गच्छेत् । पश्चिममितिहासश्रवणे, पुराणमितिवृत्तमाख्यायिकोदाहरणं धर्मशास्त्रं अर्थशास्त्रंचेतीतिहासः । शेष-महोरात्रभागमपूर्वग्रहणं गृहीतपरिचये च कुर्यात् ।"

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विवाह संस्कार

पं० केदारदत्त जोशी
संस्कृत महाविद्यालय

भारतीय वह्मर्षि मानव जीवन में घटित होने वाली सम और विषम परिस्थतियों से परिचित थे। विकास को पूर्णत्व की स्थिति में रखने के लिए उन्होंने अपने भौतिक शरीर को प्रयोगशाला बनाया। उससे प्राप्त रहस्यों से उन्होंने भावी सन्तानों को परिचित कराया है, जिसके अनुसार जीवन को महान बनाने के लिए मानवीय संस्कारों का होना अत्यन्त आवश्यक है। विश्व के सभी कार्य नियम पर ही आधारित होते हैं। नियमों के विना कोई अच्छी व्यवस्था नहीं बन सकती है। मानव जीवन नियमित हो, इसके लिए सुसंस्कारों की आवश्यकता है। गर्भाधान से लेकर मृत्यु पर्यन्त के सभी संस्कारों के अन्तर्गत एक प्रभावशाली वैज्ञानिक उपकरण है। इनमें सत्य का तथ्य निहित है। संस्कारों की सामाजिक, व्यावहारिक और पारिवारिक सभी व्यवस्थाओं में उपादेयता बताई गई है। संस्कार एक आदर्श की भी स्थापना करते हैं, क्योंकि पशुवत् जड़वत् और निष्प्राण जीवन को सुन्दर संस्कारों के द्वारा ही, विवेक सम्पन्न, तथा ज्योतिमय बनाया जा सकता है।

संस्कार का अभिप्राय है, उत्तम आचरण रूप कर्म से उत्पन्न अतिशय गुण विशेष; जिससे शरीरात्मा और अन्तरात्मा दोनों की शुद्धि हो।[1] संस्कार दो प्रकार के होते हैं। एक तो ब्राह्म संस्कार और दूसरे दैव संस्कार।[2] ब्राह्म संस्कार संख्या में सोलह है :—

गर्भाधान, पुंसवन, सीमन्त, जातकर्म, नामकरण अन्नप्राशन निष्क्रमण, चौल, (मुण्डन) कर्णवेध, व्रतादेश, वेदारम्भ, केशान्त, समावर्तन, विवाह, विवाहाग्नि परिग्रह, और त्रेताग्नि संग्रह।

इन संस्कारों को मानवीय उच्चातिउच्च श्रेणी की प्राप्ति के लिए अनिवार्य माना गया है। आर्यों की दृष्टि में जब तक मनुष्य संस्कार सम्पन्न नहीं होता है तब तक धार्मिक जगत् में उसकी मान्यता नहीं होती है तथा सामाजिक जीवन में भी संस्कार हीन व्यक्ति का कोई महत्व नहीं होता है।

उपर्यक्त संस्कारों का ज्योतिष शास्त्र के साथ पूरा सम्बन्ध है, क्योंकि प्रत्येक संस्कार का उपयुक्त समय निर्धारण ज्योतिष शास्त्र ही करता है। विद्वान् ज्योतिषी से आदिष्ट शुभ मुहूर्त में ही संस्कार कर्म प्रारम्भ करने चाहिए।[3]

उपर्युक्त षोडष संस्कारों में किसे प्राथमिकता दी जाय, इसमें मतभेद है। सूचीकरण प्रकरण में गर्भाधान संस्कार को ही प्रथम स्थान दिया गया है। किन्तु जब तक विवाह ही नहीं होता तब तक गर्भाधान संस्कार सम्भव नहीं है, अतएव संस्कारों में विवाह संस्कार को ही मुख्य संस्कार माना गया है। अतः यह उचित हैं कि संस्कारों में विवाह संस्कार को ही प्राथमिकता दी जाय।

ब्रह्मचर्य पालन पूर्वक वेदों का अध्ययन और अध्यापन का नाम ब्रह्मयज्ञ है, ब्रह्मयज्ञ से ऋषि प्रसन्न होते हैं तभी ऋषि-ऋण से मुक्ति भी होती है। यज्ञ यागादिकों के आचरण से देव-ऋण से मुक्ति होती है, तथा विवाह सम्बन्ध के द्वारा वंश परम्परा की वेल को सन्तान की उत्पत्ति से अग्रसारित करते हुए पितृ-ऋण से मुक्ति मिलती है। वैदिक परम्परा के अनुसार तीनों ऋणों से मुक्त होना मानव का मुख्य ध्येय है।[४]

ब्रह्मचर्य, गृहस्थ, वानप्रस्थ और सन्यास इन आश्रमों का मूलाधार गृहस्थ आश्रम है। तथा बिना दार परिग्रह (विवाह) के गृहस्थ आश्रम सम्भव नहीं है। जिस प्रकार प्राण वायु के आश्रय से ही सभी प्राणियों का जीवन सम्भव है, उसी प्रकार गृहस्थ आश्रम से ही शेष तीनों आश्रमों का जीवन है। तीनों आश्रमी गृहस्थ आश्रम से ही उपकृत होते हैं। इसलिए ब्रह्मचारी को प्रसन्नता पूर्वक गुरु की आज्ञा लेकर गृहस्थ आश्रम स्वीकार करना चाहिए।[५]

विवाह

"वहनं वाहः" विशिष्टो वाहो विवाहः। इस व्युत्पत्ति से निष्पन्न विवाह शब्द से विशिष्ट वाहन अर्थ की सिद्धि होती है। जहाँ पर उपनयन संस्कार से संस्कृत द्विजाति वटु को गुरुकुल में रहकर गुरु सेवा के साथ गुरु से वेद अध्ययन के नियम बताए गए हैं वहाँ पर विवाह के अनन्तर स्त्री को पति सेवा के साथ गृहस्थ धर्म के नियमों द्वारा उत्तम गृहिणी (गृहलक्ष्मी) होने की सुपात्रता बताई गई है।[६] इसलिए विवाह संस्कार के अनन्तर ही कन्या वैदिक नियमों-उपनियमों आदि के प्रति उत्तरदायिनी हो जाती है।

विवाह के आठ प्रकार बताए गए हैं—प्रतीत होता है कि प्राचीन आचार्यों के सम्मुख भी कुछ असुविधाएँ अथवा, क्षेत्रीय संकट उपस्थित हो गए होंगे जिससे उन्हें विवाह जैसे स्वच्छ, निर्मल आदर्शों से प्रतिपादित संस्कार को भी कई भागों में विभाजित करने की सामयिक आवश्यकता पड़ गई होगी।

(१) **ब्राह्म विवाह**—वर-कन्या का अलंकार आदि से पूजन कर, विचारवान् अप्रार्थक वर को जो कन्यादान दिया जाता है। उसे ब्राह्म विवाह कहते हैं।[७]

(२) **दैव विवाह**--ज्योतिष्टोमादि यज्ञ के प्रसंग में यथाविधि यज्ञीय ऋत्विक (यज्ञ सम्पन्न कराने वाले ब्राह्मण) की अलंकारों से पूजा कर उसे कन्यादान दिया जाता है, तो इसे दैव विवाह कहा जाता है।[८]

(३) **आर्ष विवाह**—एक जोड़ा गौ (स्त्री गवी पुंगौश्च) अथवा दो जोड़ा गौ, याग आदि की सिद्धि के लिए वर से लेकर उसे जो कन्या दान में दी जाती है, उसे आर्ष विवाह कहा गया है। गोरूप धन ग्रहण का उपयोग धर्म आचरण में त्रुटि नहीं होने के अभिप्राय से है। यहाँ पर वर से जोड़ा गौ लेकर कन्यादान देने की व्यवस्था अर्थ ग्रहण के लोभ के लिए नहीं है।[९]

(४) **प्राजापत्य विवाह**—पूर्व में कन्या का अलंकारादिक से पूजन कर "तुम दोनों आपस में धर्म स्वीकार करो" इत्यादि आदेश के साथ जो कन्या दान किया जाता है उसे प्राजापत्य विवाह कहते हैं।[१०]

(५) **आसुर विवाह**—कन्या के पट्टीदारों (सम्बन्धी) तथा कन्या के पिता को यथाशक्ति धन देकर (शास्त्रीय धन, परिमाण मापक धन) किए गए विवाह का नाम आसुर विवाह है।[११]

(६) **गन्धर्व विवाह**—वर-कन्या का अन्योन्य परस्पर के अनुराग से उत्पन्न सम्बन्ध का नाम गान्धर्व विवाह है, जिसे कामसम्भव भी कहा गया है।[१२]

(७) **राक्षस विवाह**—बलात्कार से कन्या का हरण राक्षस विवाह कहलाता है। कन्या-पक्षीय समाज को विनष्ट कर, उनका अंगच्छेद आदि करते हुए तोड़ फोड़ के साथ 'हे पिता, हे भ्राता, मैं अनाथा हूँ मेरा अपहरण हो रहा है, इत्यादि' चिल्लाती हुई, अश्रुप्रवाह करती हुई कन्या के अपहरण पूर्वक किए गए विवाह को राक्षस विवाह कहा गया है।[१३]

(८) **पैशाच विवाह**—मद्य मद विह्वल निर्जन देश में शील संरक्षण रहित निद्राभिभूत मैथुन मात्र प्रवृत्ति जिस विवाह में हो, उस विवाह का नाम पैशाच विवाह है।[१४]

इस प्रकार अष्ट विध विवाहों के लक्षणों का वर्णन करते हुए उत्तरोत्तर संख्या के विवाह को क्रमशः न्यून गुण का माना गया है। ब्राह्म विवाह को ही सर्वोत्कृष्टता प्रदान की गई है।[१५]

ब्राह्म विवाह से उत्पन्न सन्तति निष्पाप सन्तति होती है। ब्राह्म आदि प्रारम्भिक चार विवाहों से उत्पन्न सन्तति ब्रह्मवर्चस होती हैं। ये रूप गुण सम्पन्न, धनवान यशस्वी, पर्याप्त भोगयुक्त, धर्मिष्ट एवं शतायु सन्तानें होती है।[१६] आसुरादि अनन्तर के चार विवाहों से उत्पन्न सन्ततियाँ, क्रूर कर्मी, झूठ बोलने वाले, वेद-द्वेषी और सदाचारद्वेषी होते हैं।[१७]

ब्राह्म विवाह में विचारणीय बातें—

गोत्र विचार—वर-कन्या का एक गोत्र नहीं होना चाहिए। (नैकगोत्रामुद्वहेत्कन्याम्) एक गोत्र नहीं होते हुए भी भिन्न गोत्रों में वे ग्रहण होंगे जिनके वंशजों के आचार विचार, गुण शील व्यवहार विधान आदि की प्रायः समता होगी। वर्ग, जाति और समाज गत विशिष्ट बातों का समन्वय भी विचार पूर्वक होना चाहिए।

गोत्र और प्रवरों की संख्या अधिक हैं। इन से वंश परम्परा के अवान्तर भेदों से बहुत से कुल उत्पन्न हो गए है, अतः कहीं-कहीं पर, गोत्र और प्रवर की एकता होने से भी स्थान भेद से गोत्र प्रवर की एकता में संकोच करके भी विवाह संबंध किए जा सकते हैं।[१८]

सापिण्ड्य विचार—जिस प्रकार भिन्न गोत्र और भिन्न प्रवर में विवाह संबंध करने की व्यवस्था बताई गई है, उसी प्रकार ब्रह्मचारी को असपिण्डा कन्या के साथ विवाह करने का आदेश दिया गया है।[१९]

एक शरीर से उत्पन्न अनेक अवयव संबंध का नाम सापिण्ड्य संबंध है। ऐसा संबंध तो परम्परा से अत्यन्त व्यापक होगा, अतएव इसकी भी कोई सीमा बनानी पड़ेगी। संक्षेप में यह सीमा माता के नैहर, (ननिहाल) से, मूल पुरुष की पंचम पीढ़ी तथा मूल पुरुष

से सप्तम पीढ़ी आगे पितृ कुल तक को छोड़ कर शेष के आगे की पीढ़ियों में परस्पर विवाह संबंध हो सकता है।[२०]

चुनाव-विधि :—

समान गोत्र और सापिण्ड्य रहित दोनों कुलों को समझ कर कन्या पक्ष द्वारा वर के कुल में विवाह प्रस्ताव रखना चाहिए। ब्राह्म आदि चतुर्विध विवाहों के लिए चुनाव तथा चुनाव के पश्चात् विवाह संकार की प्राय: एक सी ही विधि होती है।

लड़का रंग भेद, रूप भेद, और शरीर भेद में खरा उतरना चाहिए। दोनों की शिक्षा-दीक्षा, कर्तव्य-क्षेत्र आदि में भी वैधानिक समता उचित होगी। लड़का रोगी, अंगहीन और वाणी विकार युक्त नहीं होना चाहिए। लड़के की गृहस्थ धर्म पर पूरी आस्था होनी चाहिए, विराग वृत्ति का नहीं हो। ज्योतिष शास्त्र के अनुसार लड़के का पूर्णायुष्य का ग्रह योग होना चाहिए। लड़के का नाम भी सुन्दर कर्णप्रिय होना चाहिए। लड़के को सच्चरित्र, मितभाषी होते हुए नैसर्गिक शुभ चेष्टाओं से युक्त भी होना चाहिए। इस प्रकार के लड़के के लिए इसी प्रकार की शुभ लक्षणा कन्या से विवाह श्रेयस्कर होगा। अशुभ लक्षणा कन्या के साथ विवाह संबंध उचित नहीं है। बड़े ललाट वाली, कुब्जा, कानी, लज्जाहीन, मिथ्याभाषिणी, रोगग्रस्ता, अंगहीन, स्थूलदेही, कलह प्रिय स्वभावा और अन्धी कन्या से विवाह संबंध करने से गृहस्थ धर्म दुर्बल होगा तथा भविष्य की सन्तानें भी ब्रह्मवर्चस नहीं होंगी।[२१] इसी प्रकार अशुभ लक्षण के लड़के के साथ भी विवाह संबंध ठीक नहीं होगा।[२२] यथा बहुत समीप के, अत्यन्त दूरी पर के, बहुत बलवान, अत्यन्त दुर्बल, आजीविका (उद्योग) हीन और अत्यन्त मूर्ख लड़के के साथ लड़की का विवाह नहीं करना चाहिए।[२३]

ब्राह्मण वर्ण महत्व का यदि हो भी तथापि उसे विद्वान् तो अवश्य ही होना चाहिए। विद्वान् शब्द से, सत्य, तप, ज्ञान, अहिंसा, विद्याप्रियता, सुशीलता इत्यादि गुण सम्पन्न वर से अभिप्राय है।[२४] ज्योतिष शास्त्रानुसार वर कन्या का नक्षत्र मेलापक और ग्रह साम्य विचार के साथ-साथ कन्या का सन्तान सौभाग्य एवं वर की दीर्घायुष्य प्रद ग्रह स्थिति को भी समझ कर ज्योतिर्विद् से आदिष्ट शुभ मुहूर्त में विवाह संस्कार की सुन्दर योजना बनानी चाहिए।

ब्राह्म विवाह संस्कार की विधि—विवाह के दिन से पहिले के ३, ६, ९ दिनों को छोड़कर किसी शुभ दिन में आर्य महिलाओं के समागम से चुल्ली निर्माण, गृह की स्वच्छता, अनेक प्रकार की सुन्दर कलाओं का निर्माण, वितान (मण्डप निर्माण) वस्त्र, रत्न, आभूषण और मिष्ठान की योजना, स्वच्छ तैल हरिद्रा, सरसों आदि के उबटन से वर और कन्या दोनों को यथा स्थान स्नान कराकर दीप पूजन के साथ गणेश आदि पंचांग कर्म से कन्या पक्षीय समाज को वारात के स्वागत में, तथा वर पक्षीय समाज को वारात के सजाव आदि में, प्रेम और प्रसन्नता के साथ प्रवृत्त होना चाहिए।

कन्या का पिता अपने घर के समीप में वारातियों के मध्य से अपने समाज के साथ शंखघण्ट, भेरी, वीणा, डिण्डिभ, मृदङ्गादि पञ्च घोष पूर्वक वर को वितान से मण्डप के

समीप लाकर, यान से उतारकर, वर के हाथ से श्रीफल आदि लेकर, अनेक कलाओं (स्वस्तिक आदि) से सुशोभित शुद्ध भूमि में, वर को प्राङ्मुख और स्वयं दक्षिण मुख होते हुए आचमन प्राणायाम के साथ, वर और वर के आचार्य का पाद प्रक्षालन करे।

संस्कार पद्धतियों के अनुसार, वाग्दान एवं वर के वरण के अनन्तर अष्टांग अर्घ आदि वर को निवेदित करने की बाते कहीं गई हैं।[२५] वर और आचार्य दोनों की पूजा बड़े सम्मान सूचक शब्दों से की जानी चाहिए। आर्ष ग्रन्थों में इसका प्रतीक अर्घ्य शब्द है। इसी प्रसंग में और भी विशेष पाँच पुरुष पूजा के पात्र बताए गए हैं।[२६]

पूजा के प्रसंग में मुख्यतया उत्तम वस्तुओं की चर्चा है।[२७]

१—पञ्चविंशतिदर्भमयं कूर्चम्—कुशासन,

२—पाद प्रक्षालन के लिए ताम्रपात्रस्थ जल,

३—हाथों में हस्तार्घ के लिए, गन्धपुष्प, अक्षत, कुश, तिल, सफेद सरसों, दही, दूर्वा और सुवर्णादि पात्र में जल।

४—कमंडलु आदि में स्थापित जल, आचमन आदि क्रिया के लिए उपयुक्त होता है।

चरण धोने के पश्चात् स्वागत-सत्कार, उभय पक्षों के परस्पर कुशल प्रश्न, मिष्टान्न ग्रहण, इत्यादि के अनन्तर मण्डप में उत्तम लग्न-मुहूर्त में विवाह संस्कार करने का विधान निम्न भाँति है—

अग्निप्रणयन, वस्त्रपरिधान, समन्जन (परस्पर निरीक्षण) गोत्रोच्चार (पहिले लड़के का, पश्चात कन्या पक्ष का) कन्या प्रतिष्ठा, कन्यादान (सुवर्ण, रत्न, गौ, भूमि इत्यादि का यथा शक्ति दान) कन्या के गृह निष्क्रमण, अग्नि समीप गमन, अग्नि प्रदक्षिणा, शमी पलाश-युक्त लावा आदि का हवन, प्रजापति, इन्द्र, अग्नि, सोम, वायु, सूर्य, विष्णु, गन्धर्व, गणेश रुद्र, रूद्राधिपति, पितर, मातामह, प्रभृति देवताओं की घी से आहुति देनी चाहिए। इस स्थल पर राष्ट्रभृद्, जय और विवाहादि होम चतुर्थी कर्म पर्यन्त के संस्कारों से सुसंस्कृत वर वधू के लिए—दोनों कुलों को अह्लादित एवं आनन्दित करते हुए, अखण्ड दाम्पत्य सुख भोगी होने की शुभ कामना करनी चाहिए।

उदक पात्र से उदक लेकर अपने ब्राह्मबल से शब्द रूप मन्त्र शक्ति से वर (पुरुष) कन्या के ऊपर अभिषेक करता है कि यदि हे कन्ये, तुम्हारे मन बुद्धि और शरीर में कदाचित् कुसंस्कारों से, पति सन्तान, पशु, गृह और यश आदि के प्रति अविश्वास भी हो तो मैं इस अभिषेक से तुम्हारे मन, बुद्धि, शरीर को अपने आदर्शमय गृहस्थ निर्माण के लिए जागरूक बनाते हुए, पूर्ण सुखप्रद और शान्तिप्रद बनाता हूँ इत्यादि।

उद्धरण

१—"तत्र संस्कारो नाम आत्मशरीरान्यतरनिष्ठो विहित क्रिया-
जन्योऽतिशय विशेषः।" (संस्कार दीपक)

२—"द्विविधो हि संस्कारो ब्राह्मो दैवश्च"—हारीतः

३—"ज्योतिर्विदादिष्टे शुभ महूर्ते" इत्यादि।

४—"जायमानो वै ब्राह्मणस्त्रिभिर्ऋण वान् जायते ब्रह्मचर्येण ऋषिभ्यो,
यज्ञेन देवेभ्यः प्रजया पितृभ्यः" तैतरीये अवदान ब्राह्मणे शाखायां श्रूयते ।

५—"यथा वायुं समाश्रित्य वर्त्तन्ते सर्वजन्तवः ।
तथा गृहस्थमाश्रित्य वर्त्तन्ते सर्व आश्रमाः ॥
यस्मात्त्रयोप्याश्रमिणो ज्ञानेनान्नेन चान्वहम् ।
गृहस्थेनैव धार्यन्ते तस्माज्जेष्ठाश्रमो गृही" ॥ मनुः ॥

६—"वैवाहिको विधिः स्त्रीणामौपनायिनकः स्मृतः ।
पति सेवा गुरौ वासो गृहार्थोऽग्निपरिक्रिया ॥ मनुः ॥

७—आच्छाद्य चार्चयित्वा च श्रुतशीलवते स्वयम्
आहूय दानं कन्यायाः ब्राह्मों धर्मः प्रकीर्तितः ॥ मनुः ॥

८—यज्ञे तु वितते सम्यगृत्विजे कर्म कुर्वते ।
अलंकृत्य सुतादानं दैवं धर्मं प्रचक्षते ॥ मनुः ॥

९—एकं गोमिथुनं द्वे वा वरादादाय धर्मतः ।
कन्या प्रदानं विधिवत् आर्षो धर्मः स उच्यते ॥

१०—सहोभौ चरतां धर्ममिति वाचानुभाष्य च ।
कन्याप्रदानमभ्यर्च्य प्राजापात्यो विधिः स्मृतः ॥

११—ज्ञातिभ्यो द्रविणं दत्वा कन्यायै चैव शक्तितः ।
कन्या प्रदानं स्वाच्छन्द्यादासुरो धर्म उच्यते ॥

१२—इच्छयाऽन्योऽन्यसंयोगः कन्यायाश्च वरस्य च ।
गान्धर्वः स तु विज्ञेयो मैथुन्यः कामसंभवः ॥

१३—हत्वा च्छित्वा च भित्वा च क्रोशन्तीं रुदतीं गृहात् ।
प्रसह्य कन्याहरणं राक्षसो विधिरुच्यते ॥

१४—सुप्तां मतां प्रमत्तां वा रहो यत्रोपगच्छति ।
स पापिष्ठो विवाहानां पैशाचश्चाष्टमोऽवमः ॥

१५—दश पूर्वान्परान्वंश्यानात्मनं चैकविंशकम् ।
ब्राह्मीपुत्रः सुकृतकृन्मोचयेदेनसः पितृन् ॥

१६—रूपसत्वगुणोपेतोः धनवन्तो यशस्विनः ।
पर्याप्तिभोगा धर्मिष्ठाः, जीवन्ति च शतं समाः ॥

१७—इतरेषु शिष्टेषु नृशंसानृतवादिनः
जायन्ते दुर्विवाहेषु ब्रह्मधर्मद्विषः सुताः ।

१८—यस्तु देशानुरूपेण कुलमार्गेण चोद्वहेत् ।
नित्यं स व्यवहार्यः स्याद्वेदाच्चैतत्प्रतीयते ॥

भृगुः—यस्मिन्देशे पुरे ग्रामे त्रैवि नगरेऽपि वा ।
यो यत्र विहितो धर्मस्तं धर्मं न प्रचालयेत् ॥
यस्मिन्देशे य आचारः पारम्पर्यक्रमागतः ।
वर्णानां चैव सर्वेषां स सदाचार उच्यते ॥

१९—अविप्लुत ब्रह्मचर्यो लक्षण्यां स्त्रियमुद्वहेत् ।
अनन्यपूर्विकां कान्तामसपिण्डां यवीयसीम् ।। याज्ञवल्क्यः ।

२०—पञ्चमात्सप्तमादूर्ध्वं मातृतः पितृतस्तथा । इति । याज्ञवल्क्यः ।
वध्वा वरस्य वा तातः कूटस्थाद्यदि सप्तमः ।।
पञ्चमी चेत्तयो र्माता तत्सापिण्डयं निवर्त्तते ।। संग्रह वाक्य ।

२१—ललाट विपुला कुब्जा निर्लज्जासत्यभाषिणी ।।
व्याधिग्रस्ता च हीनांगी स्थूला दीर्घा कलहप्रिया । (ज्योतिष सागर)

२२—अन्धो मूकः क्रियाहीनश्चापस्मारनपुंसकः ।
दूरस्थः पतितः कुष्ठी दीर्घरोगी वरो न सत् ।।

२३—अत्यासन्ने नातिदूरे नात्याढये नाति दुर्बले ।
वृत्तिहीने च मूर्खे च षड्भि कन्या न दीयते ।।

२४—सत्यं तपोज्ञानमहिंसिता च विद्याप्रियत्वं च सुशीलता च ।
एतानि यो धारयेत स विद्वान् न केवलं यः पठते स विद्वान् ।।

२५—आगतोसि वरश्रेष्ठ सर्वकामार्थ सिद्धये ।
प्रतिग्रहसमर्थोसि अर्घं गृह्ण नमोऽस्तुते ।।
नाभौ हस्ते प्रदातव्यं स्कन्धे शिरसि पादयोः ।
जानुनोरुदरे वक्षे अष्टांगोऽर्घः प्रकीर्तितः ।। (संस्कार पद्धति)

२६—षट् पुरुषा अर्घ्या भवन्ति । (१) आचार्य (२) ऋत्विक् (३) वैवाह्य वर (४) राजा (५) अपना अत्यन्त प्रिय व्यक्ति (सुहृद) (६) स्नातक (गुरुकुल से शिक्षा समाप्त ब्रह्मचारी) ।

२७—आहरन्ति विष्टरं पद्यं पादार्थमुदकमर्घमाचमनीयं मधुपर्कं दधिमधुघृतमपिहितं काᳬस्येकाᳬस्येन"

२८—"ऊं याते पतिघ्नी, प्रजाघ्नी, पशुघ्नी, गृहघ्नी, यशोघ्नी निन्दिता तनूर्जारघ्नीं तत ऽएतां करोमि, सा जीर्य्य त्वं मया सहासौ" इति ।

———

परमाणु की विशिष्ट रचना

डॉ० नन्दलाल सिंह
अध्यक्ष, स्पेक्ट्रॉस्कोपी विभाग

१—परमाणु-केन्द्र अथवा परमाणु की नाभि

खोज करते हुए पता लगा कि यदि हीलियम परमाणु के दो इलेक्ट्रान हटा लिए जायँ तो वह हीलियम परमाणु अल्फा-कण हो जाता है। उसके जीवन पर्यन्त ऐसे ही अल्फा-कण निकलते रहते हैं। अल्फा-कणों के निकल जाने के बाद रेडियम में क्या शेष बच जाता है? देखा गया कि रेडियम के समीप एक अजीब गैस एकत्र हो जाती है; किन्तु उस गैस के गुणों का पता किसी को नहीं था। इसलिए इस गैस को रेडियम-सार (radium emanation) कहा गया। बाद में पता लगा कि इस गैस के गुण नियोजन और आरगान गैस के समान हैं और यह भी आवर्त-सारणी के साधु समुदाय का एक सदस्य है। पूर्ण जानकारी प्राप्त कर लेने के बाद इस गैस का नाम रेडान रक्खा गया।

यह गैस क्या हो सकती है? **मेरी-क्यूरी** ने देखा कि रेडियम का परमाणु-भार लगभग २२६ होता है और अल्फा-कण का भार ४ पाया जाता है। यदि प्रत्येक रेडियम परमाणु से एक एक अल्फा-कण निकल जाय और शेष यदि रेडान गैस का परमाणु हो तो उसका भार २२२ होना चाहिए। इस गैस को ब्रिटिश रसायनशास्त्री **विलियम रैमजे** ने बड़े परिश्रम से इकट्ठा किया। इसमें उनका बहुत समय लगा। जब गैस पर्याप्त मात्रा में मिल गई और उसका परमाणु-भार निकाला गया तो उसका मान ठीक २२२ पाया गया। इससे अनुमान किया गया कि या तो हीलियम अकस्मात् रेडियम में उत्पन्न हो जाता है; अथवा रेडियम परमाणु की रचना ही ऐसी है कि जिसमें हीलियम कण एकाएक बनाया और निष्कासित किया जा सकता है। दूसरी विधि की सम्भावना अधिक संगत समझी गई। अन्त में लोग इस नतीजे पर पहुँचे कि इनमें से चाहे जो विधि ठीक हो परन्तु इतना निश्चित है कि रेडियम परमाणु की रचना गूढ़ है।

इस गूढ़ रचना का भेद **रुदरफोर्ड** के प्रयोगों से खुला। इन प्रयोगों में अल्फा-कण बहुत ही उपयोगी सिद्ध हुए। अल्फा-कण में दो इकाई धनात्मक आवेश होता है और इसका भार ४ इकाई पाया जाता है। रुदरफोर्ड ने सोचा कि इन कणों की धारा आवश्यकतानुसार अधिक वेग से चलाई जा सकती है। देखा गया कि रेडियम से जब अल्फा-कण निकलता है तो वह हवा में लगभग ५–६ इंच दूर जाकर लुप्त हो जाता है। इतनी दूरी के भीतर वह लाखों परमाणुओं के सम्पर्क में आता है। रुदरफोर्ड ने अल्फा-कणों को सोने के एक महीन पत्र पर डाला और जिंक सल्फाइड की एक पट्टी पीछे रख-कर भासमान विन्दु द्वारा इन कणों का निरीक्षण करने लगा।

स्वर्णपत्र पर आपतित अल्फा-कण के तीन भाग हो जाते हैं। प्रमुख भाग पत्र को पार कर सीधी दिशा में एक भासमान विन्दु जिंक सल्फाइड की पट्टी पर बनाता है। मालूम होता है कि इन कणों के मार्ग में स्वर्णपत्र का कोई परमाणु आया ही नहीं और कण शून्य स्थान से सीधे निर्गत हो गए हैं। दूसरे भाग में बहुत थोड़े कण अपने सीधे मार्ग से कुछ विचलित पाए जाते हैं। तीसरे भाग में ऐसे अल्फा-कण पाए गए जो अपने ही आकार के ठोस केन्द्र से टकरा कर परावर्तित हो गए हों, जैसे रबर की गेंद दीवाल से टक्कर खाकर वापिस आ जाती है।

सीधी दिशा में कण अधिक संख्या में जाते हैं। इससे विदित होता है कि पत्र में शून्य भाग बहुत अधिक है और स्वर्ण-परमाणु, हीलियम-परमाणु की अपेक्षा बहुत बड़ा होता है। स्वर्ण ठोस धातु है। स्वर्ण के परमाणुओं के बीच स्थान बहुत कम होगा। इतने ही रिक्त स्थान से अल्फा-कणों का बिना रोक-टोक निर्गमन समझ में नहीं आता, जब तक यह न अनुनान किया जाय कि सम्भवतः स्वर्ण-परमाणु के भीतर ही बहुत अधिक स्थान खाली पड़ा है। यदि ऐसा है तो हमें परमाणु-रचना का एक दूसरा चित्र ध्यान में लाना होगा और इस रचना के द्वारा हमें न केवल रासायनिक क्रिया सम्बन्धी सारी पुरानी जानकारी की व्याख्या करनी होगी अपितु नवीन रेडियमधर्मिता की घटनाओं को भी समझना होगा। परमाणु-रचना का ऐसा नया चित्र सर्वप्रथम रुदरफोर्ड ने वैज्ञानिक जगत् के समक्ष उपस्थित किया। उन्होंने बताया कि परमाणु में दो भाग होते हैं—पहला (मुख्य भाग) तो इसका केन्द्र होता है जिसमें परमाणु का सारा भार पाया जाता है और दूसरा बाहरी भाग है जो केन्द्र की अपेक्षा दस हज़ार गुना स्थान घेरे हुए है। इस बाहरी भाग में केवल इलेक्ट्रान ही पाए जाते हैं। इलेक्ट्रानों पर ऋणात्मक आवेश होता है और चूँकि परमाणु आवेश-रहित पाया जाता है इसलिए केन्द्र पर उतनी मात्रा में धनात्मक आवेश होना निश्चित है।

इस रचना के अनुसार अल्फा-कण हीलियम-परमाणु का सूक्ष्म केन्द्र (nucleus) मात्र है क्योंकि हीलियम परमाणु से दो इलेक्ट्रान निकाल लिए गए हैं। अल्फा-कण इतने सूक्ष्म होते हैं कि वे स्वर्णपत्र के भीतर बिना किसी से टकराए पार कर जाते हैं। जब कोई स्वर्ण परमाणु अल्फा-कण के किसी परमाणु के केन्द्र से टकराता है तो वह या तो परावर्तित हो जाता है, अथवा अपने पथ से विचलित हो जाता है। कारण कि स्वर्ण परमाणु का केन्द्र धनात्मक होता है और उसी प्रकार अल्फा-कण भी धनात्मक होता है और परमाणुओं का सारा भार उन्हीं में केन्द्रीभूत होता है। अतः दोनों म प्रतिसारण होना स्वाभाविक है; किन्तु दोनों अत्यन्त सूक्ष्म होते हैं। इस कारण कदाचित् ही आमने-सामने आ पाते हैं। यदि संयोग से दोनों एक सीध में आ गए तो मुठभेड़ दो वजनी कणों के बीच होती है। उनमें अल्फा-कण हल्का होता है। अतः वही विमुख उछाल खाता है। परमाणु में इलेक्ट्रानों का स्थान केन्द्र के बाहर होता है और यह स्थान न्यूक्लियस की अपेक्षा बहुत बृहद् होता है। इसीलिए परमाणु से इलेक्ट्रानों को निकाल बाहर करना सुगम होता है। इनमें कई तो सतह पर ही रहते हैं और रासायनिक क्रिया में परमाणु को संयोजन शक्ति प्रदान करते हैं। इनको रासायनिक अथवा संयोजक इलेक्ट्रान कहते हैं, इनको परमाणु से निष्कासित करना सहज होता है।

२—परमाणु में ऋणात्मक और धनात्मक विद्युत आवेश बराबर होता है।

न्यूक्लियस के बाहरी बृहद् स्थान में परमाणु के भीतर कितने इलेक्ट्रान होते हैं ? यह संख्या तत्त्व-तत्त्व में भिन्न पाई जाती है। हाइड्रोजन सबसे हल्का परमाणु है और इसके एक इलेक्ट्रान को निष्कासित कर हम सहज रीति से H^+ आयन पा सकते हैं। इस H^+ आयन पर इकाई धनात्मक आवेश होता है। साथ ही H परमाणु से केवल एक ही इलेक्ट्रान निकाला जा सकता है। सम्भवतः उसमें एक ही इलेक्ट्रान होता है। क्षण भर के लिए यदि हम यही मान लेते हैं तो हाइड्रोजन परमाणु में जिसका भार १ माना गया है एक न्यूक्लियस होगा जिसका भार १ है और उस पर इकाई धनात्मक आवेश होना चाहिए। इस न्यूक्लियस के बाहर एक ही इलेक्ट्रान होना चाहिए जो न्यूक्लियस के भार की अपेक्षा १/१८४० वजन का होता है और इसी इलेक्ट्रान का इकाई ऋणात्मक आवेश न्यूक्लियस के चतुर्दिक फैला हुआ घूमता रहता है। आवर्त-सारणी में क्रमबद्ध दूसरा परमाणु हीलियम तत्त्व का है। इसका परमाणु-भार ४ होता है। दो बाहरी इलेक्ट्रानों में से एक तो बड़ी सरलता से निकाला जा सकता है, किन्तु दूसरे इलेक्ट्रान के निष्कासन में कुछ कठिनाई अवश्य पड़ती है; किन्तु दो से अधिक इलेक्ट्रान हीलियम परमाणु से नहीं निकलते। एक इलेक्ट्रान के निकलने से He^+ आयन और दूसरे के निष्कासन से He^{++} आयन बनता है। यही He^{++} आयन अल्फा-कण होता है, जो १८००० मील प्रति सेकण्ड के वेग से रेडियम-परमाणु से निकलता है। ऐसे कण गाइजलर नली में भी उत्पन्न किए जा सकते हैं। शून्य नली में तनिक हीलियम गैस भर कर विद्युत प्रवाह करने पर हम He^{++} आयन अथवा अल्फा-कण पा सकते हैं। अतः हीलियम परमाणु के न्यूक्लियस में भार ४ इकाई और धनात्मक आवेश २ इकाई होता है। यह धनात्मक आवेश बाहरी दो इलेक्ट्रानों के ऋणात्मक आवेश से संतुलित हो जाता है और परमाणु आवेशरहित पाया जाता है।

इस रीति से क्या तीसरे तत्त्व लीथियम के परमाणु में ३ इलेक्ट्रान, चौथे तत्त्व बेरीलियम-परमाणु में ४, पाँचवें तत्त्व बोरान परमाणु में ५, और क्या ९२ वें तत्त्व यूरेनियम में ९२ इलेक्ट्रान, न्यूक्लियस के बाहरी प्रदेश में हो सकते हैं ? सम्भव ही नहीं, यही वास्तविक सत्य है। इसका समर्थन अनेक प्रयोगों द्वारा हो चुका है। इनमें कई प्रमाण तो बड़े ही मनोरंजक हैं और उनसे यह भी विदित होता है कि एक क्षेत्र की जानकारी से हम किस प्रकार अपना ज्ञान-भण्डार अन्य क्षेत्रों के सम्बन्ध में बढ़ा सकते हैं।

आपने छत के किसी बारीक छिद्र से सूर्य की किरणों को बन्द कमरे के भीतर आते देखा होगा। इन किरणों का मार्ग कमरे की हवा में विद्यमान धूल के कणों से दिखाई पड़ता है। यदि धूल के कण बिल्कुल न हों तो हम फर्श पर सूर्य का केवल प्रतिबिम्ब देख पाएँगे और हमे मार्ग नहीं दिखाई पड़ेगा। किरणें धूल कणों से विक्षिप्त हो जाती है। इन्हीं विक्षिप्त किरणों से हमें धूल के कण दिखाई पड़ते हैं। जितनी ही अधिक मात्रा में धूल के कण हवा में होते हैं, किरणों का मार्ग हमें उतना ही स्पष्ट दिखाई पड़ता है। धूल की अधिकता से कभी-कभी दूसरी ओर की चीजें ओझल पड़ जाती हैं। इसी प्रकार मोटरगाड़ी तथा बस और ट्रेन के सामने की बत्ती से हमें प्रकाश समूह दिखाई पड़ता है। यदि घना कुहरा पड़ रहा हो; अर्थात् हवा में पानी के कण अधिक संख्या म हों तो विक्षिप्त

प्रकाश से हम जल के कणों द्वारा बत्ती की रोशनी का प्रकाशित मार्ग देख पाते हैं, किन्तु कुहरे के पार तीव्रतम प्रकाश से भी हम कोई चीज नहीं देख सकते। यदि हम आपतित किरणों में से निर्गत किरणों की तीव्रता मालूम करलें और साथ ही विक्षिप्त किरणों की तीव्रता नाप लें, तो हम जल अथवा धूल के विक्षेपक किरणों की संख्या मालूम कर सकते हैं। इसी विधि से वैश्लेषिक रसायन (analytical chemistry) द्वारा हम आकाश में विचरने वाले धुन्ध के सूक्ष्म धूल-कणों की संख्या अथवा गँदले जल में विचरने वाले गंदगी के कणों की संख्या बता सकते हैं। इसी प्रकार की एक विधि से हम परमाणु केन्द्र के बाहरी स्थान में विराजमान इलेक्ट्रानों का पता लगाते हैं।

अनुमान कीजिए कि इलेक्ट्रान परमाणु के नन्हें केन्द्र के चतुर्दिक आपेक्षिक बृहद् स्थान में उसी भाँति टिके हुए हैं, जैसे स्तब्ध वायु में धूल के कण आकाश में टिके रहते हैं। ठोस पदार्थ में परमाणु बहुत निकट रहते हैं। उन परमाणुओं के बीच इलेक्ट्रानों का एक समांशी माध्यम वना रहता है। इस माध्यम में कहीं-कहीं परमाणु केन्द्र पाए जाते हैं। मान लीजिए कि प्रकाश की किरणपुंज इलेक्ट्रानों के इस समांशी माध्यम में भेजी जा रही है। यदि माध्यम में इलेक्ट्रानों का घनत्व कम है तो थोड़ा ही प्रकाश विक्षिप्त हो सकेगा और अधिक मात्रा में प्रकाश माध्यम को विना रोक-टोक पार कर सकेगा; किन्तु यदि घनत्व अधिक है; अर्थात् इलेक्ट्रानों की संख्या अधिक है तो अधिक प्रकाश विक्षिप्त होगा और बहुत थोड़ी मात्रा में प्रकाश माध्यम को पार कर सकेगा।

प्रकाश की किरणों के तरंग-दैर्घ्य बड़े होते हैं। इस कारण साधारण दृष्टिगोचर किरणें इस प्रयोग के लिए स्थूल पाई जाती हैं। इनके तरंग इलेक्ट्रान समूह को दावते हुए स्वयं विक्षिप्त हुए विना पार कर जाते है। इस इलेक्ट्रान-माध्यम के अध्ययन के लिए हमें सूक्ष्मतर तरंगों की आवश्यकता होती है। एक्स किरण की तरंगे इनके अनुकूल पाई जाती हैं। इनका तरंग-दैर्घ्य प्रकाशमान किरणों के तरंग-दैर्घ्य का लगभग १/१०००० होता हैं। आवर्त-सारिणी के क्रमबद्ध तत्त्वों में से एक-एक के महीन पत्र लेकर एक्स-किरण का विक्षेपण देखा जाता है तो क्रमसंख्या के अनुसार एक के बाद दूसरे तत्त्व में उसके केन्द्र के बाहर एक और इलेक्ट्रान विद्यमान पाया जाता है। यदि हाईड्रोजन में एक इलेक्ट्रान और हीलियम में दो हों तो लीथियम में तीन, बेरीलियम में चार और इसी क्रम से यूरेनियम में ९२ इलेक्ट्रान पाए जाते हैं। ९३ से लेकर ९९ तक इलेक्ट्रानों की संख्या वाले कृत्रिम तत्त्वों का भी पता आज हमें लग गया है। आवर्त-सारणी में तत्त्व की जो परमाणु-संख्या उसके स्थान के अनुसार दी हुई है, उसी संख्या में इलेक्ट्रान उस तत्त्व के परमाणु केन्द्र के बाहर पाए जाते हैं। परमाणु-संख्या के अनुकूल तत्त्व आवर्त-सारिणी म एक विशिष्ट स्थान रखते हैं। इस स्थान से तत्त्व के रासायनिक गुणों का पता लगा है। अतः किसी तत्त्व के रासायनिक गुण उसके परमाणु केन्द्र के बाहरी इलेक्ट्रानों की संख्या पर निर्भर करते हैं। इस निष्कर्ष को हमें सदा ध्यान में रखना चाहिए।

हम पहले बता चुके हैं कि इलेक्ट्रान स्वयं ऋणात्मक आवेश होता है और परमाणु सामान्य स्थिति में सदा आवेशरहित पाया जाता है। अतः परमाणु केन्द्र में धनात्मक आवेश की मात्रा ठीक बाहरी इलेक्ट्रानों की संख्या के बराबर पाई जाती है। यह केवल

मान लेने की बात नहीं क्योंकि इसके लिए हमारे पास कई प्रत्यक्ष प्रमाण हैं। इनमें से यहाँ पर केवल एक ही सरल प्रमाण प्रस्तुत किया जाता है, क्योंकि इसका आधार पूर्वोक्त स्वर्णपत्र का ही प्रयोग है।

सभी धातुओं के पत्र में अल्फा-कण का विक्षेपण समान नहीं होता। यह धातु के परमाणु-केन्द्र के आवेशमान का समानुपाती पाया जाता है। धनात्मक अल्फा-कण धनात्म केन्द्र द्वारा प्रतिसारित होकर विक्षिप्त होता है। जितना अधिक धनात्मक आवेश केन्द्र में पाया जाता है उतना ही अधिक अल्फाकण का विक्षेपण होता है, अर्थात् बड़े केन्द्र वाले धातु में विक्षेपण अधिक और छोटे केन्द्र वाले धातु में कम पाया जाता है। केन्द्र की गुरुता धातु की परमाणु-संख्या पर निर्भर है। उच्च परमाणु-संख्या वाली धातु में अल्फा-कण का विक्षेपण अधिक और कम परमाणु-संख्या वाली धातु में विक्षेपण कम पाया जाता है। अतः स्पष्ट है कि अल्फा-कण के विक्षेपण कोण को नापकर हम केन्द्र की आवेशमात्रा का मान ज्ञात कर सकते हैं।

अल्फा-कण के विक्षेपण का प्रयोग अनेक धातुओं के साथ किया गया और सभी प्रयोगों के फल उपरोक्त सिद्धान्त के अनुकूल ही पाए गए। क्रमानुसार उच्चतर परमाणु संख्या के धातुपत्र लेकर देखे गए। अल्फा-कण का विक्षेपण नीचे वाली धातु की अपेक्षा एक संख्या ऊपर वाली धातु में ठीक इतने मान से बढ़ता जाता है जितना ऊपर वाले धातु केन्द्र पर इकाई धनात्मक आवेश बढ़ाने से होना चाहिए। परमाणु-संख्या के महत्व पर तनिक फिर विचार कीजिए। इससे हमें न केवल केन्द्र के बाहरी इलेक्ट्रानों की संख्या मालूम होती है जिसपर तत्त्व के रासायनिक गुण निर्भर हैं, अपितु इसी से हमें यह भी ज्ञात होता है कि उसी संख्या के बराबर इकाई धनात्मक आवेश उस तत्व के केन्द्र में पाया जाता है। केन्द्र का बाहरी ऋणात्मक आवेश भीतरी समतुल्य धनात्मक आवेश का निराकरण कर परमाणु को आवेशशून्य बनाए रखता है।

३—परमाणु केन्द्र की सूक्ष्मतर बातें

परमाणु चित्र में हमें एक केन्द्र दिखाई पड़ता है और उसके बाहर चारो ओर इलेक्ट्रान हैं जो केन्द्र की अपेक्षा हज़ारों गुना बड़े क्षेत्र में उसे घेरे हुए हैं। परमाणु संख्या अर्थात् तत्त्व की आवर्त-सारिणी में क्रमसंख्या से इन बाहरी इलेक्ट्रानों की संख्या का बोध होता है और यह भी विदित होता है कि उसी संख्या के बराबर धनात्मक आवेश उसके केन्द्र पर पाया जाता है। परमाणु-भार वास्तव में केन्द्र ही का भार होता है क्योंकि इलेक्ट्रान का आपेक्षिक भार नगण्य पाया गया है। हम जानते हैं कि इलेक्ट्रान ऋणात्मक विद्युत आवेश की इकाई है और इसका भार हाइड्रोजन परमाणु-भार का १/१८४० होता है। अब हमें यह जानने की इच्छा है कि यह केन्द्र क्या है? इसमें धनात्मक विद्युत आवेश किस रूप में पाया जाता है और इसका भारीपन किन बातों पर निर्भर है? इन प्रश्नों के उत्तर भी हमें फिर उसी प्रतिभाशाली प्रो० रुदरफोर्ड के प्रयोगों और अनुशीलन से मिले।

रुदरफोर्ड ने बहुत से तत्त्वों के परमाणु-केन्द्र तोड़ने की कोशिश की। किसी गढ़ को तोड़ने के लिए गोली-बारूद की आवश्यकता पड़ती है। सूक्ष्म केन्द्र को तोड़ने के लिए

उन्होंने रेडियम से निकले हुए अल्फा-कण का उपयोग गोली के समान किया। पहले उन्होंने हाइड्रोजन गैस में अल्फा-कण का बौछार चलाया और उस क्षण की प्रतीक्षा में रहे जब कोई अल्फा-कण गैस के किसी ठोस विन्दु से टकरा जाए। स्वर्णपत्र की अपेक्षा हाइड्रोजन गैस में परमाणुओं की संख्या कम होती है, अतः ऐसी मुठभेड़ की सम्भावना बहुत कम पाई जाती है। प्रायः सभी अल्फा-कण गैस को पार कर बाहर चले आते हैं। किन्तु यदि संयोग से किसी एक अल्फा-कण को टकराने का अवसर मिलता भी है तो वह हाइड्रोजन केन्द्र को बचाता हुआ केवल उसे अगल-बगल तनिक झुका देता है। कारण कि अल्फाकण हाइड्रोजन परमाणु से चौगुना भारी होता है और लगभग १८००० मील प्रति सेकंड के वेग से हाइड्रोजन केन्द्र के निकट आता है। दोनों में धनात्मक आवेश होने से वे टकराते नहीं, उनके बीच प्रतिसारण होता है और हल्का होने से हाइड्रोजन केन्द्र विक्षिप्त होता है। प्रयोग में निस्सन्देह हाइड्रोजन केन्द्र पर भीषण धक्का लगता है। हाइड्रोजन केन्द्र को छोड़कर कभी कोई दूसरा कण मिला ही नहीं। इसके बाद रुदरफोर्ड नाइट्रोजन के केन्द्र तोड़ने में संलग्न हुए। इस गैस में मुठभेड़ का अवसर हाइड्रोजन की अपेक्षा अधिक पाया गया और देखा गया कि अल्फा-कण के टकराने से नाइट्रोजन से हाइड्रोजन के केन्द्र बनते जाते हैं। अब वे अल्फा-कण द्वारा सोडियम परमाणु केन्द्र को भेदने में तल्लीन हुए और इस प्रयोग में फिर वही हाइड्रोजन केन्द्र मिले। इस प्रकार के कई प्रयोगों में अनेक परमाणुओं के केन्द्र से अल्फा-कण के आघात से हाइड्रोजन केन्द्र निकलते गए। इससे कम भार का कोई अन्य कण नहीं मिला। अतः निष्कर्ष निकला कि धनात्मक हाइड्रोजन आयन H^+ केन्द्र रचना की मुख्य ईंट है (सभी परमाणु केन्द्रों का निर्माण इसी से हुआ है।

वास्तव में कीमियागीरी के सर्वप्रथम प्रयोग यही थे। रुदरफोर्ड के प्रयोगों ने एक नये युग का आवाहन किया और परमाणु रसायन की नींव डाली गई। रेडियमधर्मिता की खोज होने के साथ यह तो विदित हो गया कि प्रकृति में स्वतः तत्त्वों का रूपान्तर होता रहता है; किन्तु कृत्रिम रूप से एक तत्त्व को दूसरे में बदलने की विधि सबसे पहले रुदरफोर्ड ने निकाली। इतना अवश्य हुआ कि कुछ समय तक इन प्रयोगों में भेदने की शक्ति रेडियमधर्मी तत्त्वों से विकीर्ण प्रकृति के अल्फा-कणों से उपार्जित की गई।

धनात्मक हाइड्रोजन केन्द्र इतना व्यापक पाया गया कि इसका नामकरण हुआ और इसे प्रोटान कहा गया। प्रोटान H^+ का भार इकाई माना गया और इस पर धनात्मक इकाई आवेश पाया गया। प्रोटान को छोड़कर अन्य कोई छोटा कण मिला नहीं। अतः सिद्ध हुआ कि प्रोटान ही से सभी तत्त्वों के परमाणु केन्द्र की रचना हुई है।

अब न्यूक्लियस के चित्र में एक बड़ी विचित्रता दिखाई पड़ती है। हाइड्रोजन की परमाणु-संख्या १ है। इसलिए इसमें इकाई भार का प्रोटान होता है जिसपर धनात्मक इकाई आवेश पाया जाता है और इसके चारो ओर एक इलेक्ट्रान घूमता रहता है। किन्तु हीलियम को लीजिए, इसकी क्रम संख्या २ है। इसके परमाणु में २ इलेक्ट्रान होते हैं जो केन्द्र के दो धनात्मक इकाई आवेश से संतुलित रहते हैं। धनात्मक इकाई आवेश दो प्रोटान से मिलेंगे, अतः हीलियम के केन्द्र में दो प्रोटान होने चाहिए और इसका परमाणु

भार २ इकाई होना चाहिए; किन्तु हीलियम का परमाणु भार ४ होता है। भार में २ इकाई की बढ़ती कहाँ से हुई ? हीलियम ही नहीं अन्य तत्त्व केन्द्रों के संवन्ध में भी ऐसी ही बात पाई जाती है। लीथियम की परमाणु-संख्या ३ है, इसलिए इसके केन्द्र पर ३ धनात्मक इकाई आवेश होते हैं; अर्थात् इसमें ३ प्रोटान रहते हैं। अतः परमाणु भार ३ होना चाहिए, किन्तु परमाणु भार ७ है। यहाँ भी हमें भार में ४ इकाई वृद्धि का रहस्य समझना है। कार्बन को लीजिए, क्रम संख्या ६ के अनुसार बाहर ६ इलेक्ट्रान और केन्द्र में ६ प्रोटान होने से परमाणु-भार ६ इकाई होना चाहिए, किन्तु इसका परमाणु-भार १२ इकाई होता है। यहाँ भी ६ इकाई भार की अधिकता के रहस्य को समझना है। केवल हाइड्रोजन को छोड़कर सभी तत्त्वों के परमाणु-भार अपनी क्रमसंख्या के लगभग दूने मान के होते हैं। उच्चतर संख्या वाले तत्त्वों का परमाणु भार उनकी परमाणु संख्या के दूने मान से भी अधिक होता है, यथा चाँदी की क्रमसंख्या आवर्त-सारिणी में ४७ है जबकि इसका परमाणु-भार १०८ है। शीशे (lead) की संख्या ८२ है, किन्तु परमाणु-भार २०७ है। यूरेनियम की परमाणु-संख्या ९२ है किन्तु परमाणु-भार २३८ है। प्रश्न उठता है कि केन्द्रों के भार में बढ़ती कहाँ से होती है ?

लगभग २० वर्ष तक इस रहस्य का पता न लग सका क्योंकि लोगों कों विश्वास था कि केन्द्र के टूटने से केवल प्रोटान ही निकलते हैं और मान लिया गया था कि परमाणु-भार के अनुसार उनमें उतने ही प्रोटान पाए जाते हैं। इस धारणा से केन्द्र पर धनात्मक आवेश की अधिकता पाई जाती है किन्तु परमाणु आवेशरहित होता है। अतः परमाणु-भार और परमाणु-संख्या अर्थात् बाहरी इलेक्ट्रानों की संख्या उनके अन्तर के बराबर मान लिया गया कि न्यूक्लियस के भीतर इलेक्ट्रान होते हैं। जैसे कार्बन का परमाणु-भार १२ और संख्या ६ है तो न्यूक्लियस में १२ प्रोटान और बाहर ६ इलेक्ट्रान हुए। इस प्रकार धनात्मक आवेश ६ इकाई अधिक हो जाता है। इसके निराकरण के लिए कार्बन न्यूक्लियस में ६ इलेक्ट्रान लिए गए। न्यूक्लियस के इलेक्ट्रान स्वतन्त्र रूप में नहीं पाए जाते। वे प्रोटानों से अपनी संख्या के बराबर मिलकर न्यूक्लियस के भीतर ही आवेश रहित हो जाते हैं। यथा कार्बन के न्यूक्लियस में ६ प्रोटान स्वतंत्र किन्तु बाकी ६ प्रोटान ६ इलेक्ट्रानों से संयुक्त होकर ६ आवेश शून्य कणिकायें बनाते हैं।

सन् १९३२ के पहले कुछ केन्द्रों की रूपरेखा—केन्द्र के भीतर कई प्रोटान (+) और कई प्रोटान—इलेक्ट्रान संगठित माने जाते थे।

हीलियम में भार के अनुसार ४ प्रोटान होते हैं; किन्तु दो उनमें से २ इलेक्ट्रान से संगठित रह आवेश शून्य रहते हैं। इस प्रकार केन्द्र का आवेश २ इकाई रह जाता है। लीथियम में ७ प्रोटान होते हैं जिनमें ३ स्वतंत्र और ४ प्रोटान एक-एक इलेक्ट्रान के साथ आवेशशून्य रहते हैं। इस प्रकार केन्द्र पर धनात्मक आवेश ३ इकाई रह जाता है जो ३ बाहरी इलेक्ट्रानों से संतुलित हो जाते हैं। यही नियम ऊँची संख्या के तत्त्वों में भी लागू था। जैसे यूरेनियम की परमाणु-संख्या ९२ है तो यदि बाहर ९२ इलेक्ट्रान और इसका भार २३८ है, तो केन्द्र में २३८ प्रोटान होते हैं; किन्तु धनात्मक आवेश २३८—९२=१४६ इकाई

अधिक होता है। इन्हीं १४६ प्रोटानों के साथ एक-एक इलेक्ट्रान संगठित हो जाते हैं और उन्हें आवेशशून्य बनाकर परमाणु के ऋणात्मक और धनात्मक आवेश को बराबर रखते हैं।

यह विधान तर्क सिद्ध तो रहा किन्तु वैज्ञानिकों के मन में जमा नहीं। जहाँ तक परमाणु में धनात्मक और ऋणात्मक आवेशों का प्रश्न था वह अवश्य हल हुआ किन्तु प्रोटान तथा इलेक्ट्रान का केन्द्र के भीतर संगठन खटकता रहा। अनेक और बातें थीं जिनका भी स्पष्टीकरण नहीं हो सका। यही परिस्थिति १९१२ ई० तक बनी रही। इसी बीच कई घटनायें घटीं जिनसे परमाणु-रचना-चित्र पर अधिक प्रकाश पड़ा।

परमाणु सौर-जगत् के समान

जब से परमाणु की रचना में केन्द्र की कल्पना की गई, तब से दो तरह के प्रयोग किए जाने लगे। एक तरह के प्रयोगों से बाहरी इलेक्ट्रानों की सजावट की खोज होने लगी और दूसरे प्रकार के प्रयोगों से केन्द्र के भीतर का अध्ययन प्रारम्भ किया गया। परमाणु की इस कहानी में चूँकि हमें परमाणु बम का रहस्य समझना है इसलिए बाहरी इलेक्ट्रानों की विशेष चर्चा विषयान्तर हो सकती है, क्योंकि परमाणु बम की शक्ति केन्द्र से ही विकीर्ण होती है। तब भी इन बाहरी इलेक्ट्रानों का कुछ अध्ययन आवश्यक है। इस परिच्छेद में इन्हीं का विवरण दिया जाएगा। यदि पाठक अबतक इस कहानी को ठीक समझ पाए हैं तो उन्हें विदित हो गया होगा कि परमाणु की कहानी में केन्द्र ही सब कुछ नहीं हैं और उन्हें सम्पूर्ण परमाणु की रचना को हृदयंगम करने की उत्कंठा स्वतः उत्पन्न हो गई होगी।

अल्फा-कणों के विक्षेपण का अध्ययन कर ज्यों ही रुदरफोर्ड ने परमाणु केन्द्र की कल्पना की उसके तुरन्त बाद ही से केन्द्र के बाहरी इलेक्ट्रानों के अध्ययन में वैज्ञानिक संलग्न हुए। इस अनुशीलन में लोगों के मन में जो अभिरुचि पैदा हुई उसका श्रेय **प्रो० नील्स बोर** को है।

परमाणु में केन्द्र के बाहरी क्षेत्र का विस्तार जिसमें इलेक्ट्रान रहते हैं केन्द्र की अपेक्षा अथवा नन्हें इलेक्ट्रान की अपेक्षा बहुत ही बृहद् होता है। हाइड्रोजन का एक ही इलेक्ट्रान परमाणु के बृहद् क्षेत्र की परिधि पर रहता है। यदि हाइड्रोजन के केन्द्र को क्रिकेट की गेंद के बराबर माना जाय तो इसका इलेक्ट्रान गेंद की सतह से धूल कण के परमाणु का व्यास लगभग १/२००,०००,००० इंच होता है अर्थात् यदि २००,०००,००० हाइड्रोजन परमाणु सटाकर एक सीध में रक्खे जाँय तो वे सब मिलकर १ इंच के बराबर होंगे। परमाणु के बृहदाकाश की तुलना में न्यूक्लियस अथवा इलेक्ट्रान का परिमाण नगण्य है। इसी बृहदाकाश में बाहरी इलेक्ट्रान विचरण करते हैं किन्तु वे बेतरतीब जहाँ कहीं नहीं पड़े रहते। इनके तरतीब की झलक हमे आवर्त-सारिणी से ही मिलती है। सारिणी में तत्त्वों की सुव्यवस्था से ही अनुमान होता है कि बाहरी क्षत्र में इलेक्ट्रान कदापि अव्यवस्थित नहीं रह सकते। सारी रासायनिक क्रियायें इन्हीं बाहरी इलेक्ट्रानों में से कुछ पर आश्रित हैं। इन्हीं के आदान-प्रदान से परमाणुओं का रासायनिक बन्धन बनता है और उन्हीं बन्धनों से आबद्ध परमाणु अणु बनाते हैं। इसके अलावा हमने यह भी देखा है कि आवर्त-सारिणी के क्रमबद्ध तत्त्वों में इलेक्ट्रानों की संख्या एक-एक करके क्रम से बढ़ती जाती है। इन सब बातों से सिद्ध होता है कि इलेक्ट्रान किसी नियम के अनुसार परमाणु के भीतर सुव्यवस्थित रहते हैं।

आवर्त-सारिणी पर तनिक फिर ध्यान दीजिए। (चित्र संख्या २ प्रज्ञा, IX (2), पृष्ठ ९२) लीथियम के नीचे उसी स्तम्भ में कोमल क्षारक धातु लीथियम, सोडियम, पोटैशियम, रुबीडियम, सीजियम और फ्रैन्सियम हैं। हम इन सब से परिचित हैं। हाइड्रोजन दो स्तम्भों में लिया जा सकता है। इसे हम लीथियम स्तम्भ में भी रख सकते हैं। हाइड्रोजन सहित इन सब तत्वों की संयोजन शक्ति १ होती है। इन सब के परमाणु एक बन्धन वाले परमाणु होते हैं। एक बन्धन से हमें बोध होता है कि इन सब के परमाणु की सतह पर एक इलेक्ट्रान है। अतः उसमें एक बन्धन होता है। लीथियम में ३ इलेक्ट्रान होते हैं तिसपर भी इसमें १ इलेक्ट्रान ऐसा है जो सतह पर रहता है जो बन्धन शक्ति प्रदान करता है। इसी भाँति सोडियम में ११ इलेक्ट्रान होते हैं, जिनमें एक इलेक्ट्रान बाहरी सतह पर रहता है, जिसके कारण सोडियम में एक बन्धन उत्पन्न होता है। पोटैशियम में १९ इलेक्ट्रान होते हैं जिनमें केवल एक इलेक्ट्रान द्वारा रासायनिक बन्धन उत्पन्न होता है। सोडियम में ३७ इलेक्ट्रान और सीज़ियम में ५५ इलेक्ट्रान होते हैं किन्तु इन सब में केवल एक ही इलेक्ट्रान बाहरी सतह पर रहता है।

ऐसा प्रतीत होता है कि इलेक्ट्रान नियमानुकूल केन्द्र को घेरे हुए कई पर्तों में बटे रहते हैं। प्रत्येक पर्त क्षारीय धातु से प्रारम्भ होती है। एक आवृत्ति पूरी होने पर दूसरी पर्त फिर क्षारीय धातु पर शुरू होती है। हर एक परत के प्रारम्भ में केवल १ इलेक्ट्रान रहता है। इन धातुओं का यही इलेक्ट्रान जो सबसे ऊपरी नई परत में रहता है, रासायनिक तथा अन्न क्रियाओं के लिए सुलभ होता है। इसी कारण सभी क्षारीय धातुओं के गुण समान पाए जाते हैं।

यदि बाहरी इलेक्ट्रानों की सुव्यवस्था इस प्रकार की परतों में है तो निसन्देह प्रत्येक क्षारीय धातु के एक संख्या पहले वाले परमाणु की बाहरी परत पूरी भरी हुई सुदृढ़ होनी चाहिए। इसमें से किसी एक इलेक्ट्रान को निकालना सहज नहीं। इसीलिए ऐसे तत्वों के परमाणु में संयोजन शक्ति नहीं पाई जाती और वे निष्क्रिय होते हैं। किसी अन्य तत्त्व से संगठित होकर वे यौगिक नहीं बना सकते। आवर्त-सारिणी में आप लीथियम के पहले हीलियम पायेंगे। हीलियम एक ऐसी ही निष्क्रिय गैस है। इसी तरह के सोडियम के पहले नियोन, पोटैशियम के पहले अरगान, रुबीडियम के पहले क्रिप्टान और सीजियम के पहले जेनान हैं और वे सब निष्क्रिय साधु गैस हैं, जो एक ही स्तम्भ में पाए जाते हैं। इनका किसी तत्त्व से रासायनिक संयोग नहीं होता। इन सब में इलेक्ट्रान की परतें सम्पूर्ण भरी हुई पाई जाती हैं।

इस विधान से हमें ज्ञात होता है कि पहली भरी हुई पर्त में दो इलेक्ट्रान हीलियम परमाणु में होते हैं। दूसरी पर्त ८ इलेक्ट्रानों से नियोन परमाणु से भर जाती है और पहली पर्त को लेकर नियोन में १० इलेक्ट्रान होते हैं। तीसरी पर्त फिर ८ इलेक्ट्रानों से अरगान परमाणु में भर जाती है और पहले दोनों परतों को मिलाकर अरगान में २+८+८=१८ इलेक्ट्रान होते हैं। क्रिप्तान में चार तहें भरी होती हैं, चौथी तह के प्रारम्भ होते इसकी तीसरी तह की पूर्ति १८ इलेक्ट्रान से होती है और चौथी की पूर्ति ८ इलेक्ट्रानों से होती है। इसमें कुल २+८+१८+८=३६ इलेक्ट्रान होते हैं। जेनान

में ५ तहें भरी रहती हैं। अब इसकी चौथी तह बढ़कर १८ इलेक्ट्रान ग्रहण करती है और ५ वीं में फिर ८ इलेक्टान, कुल २+१८+१८+१८+८=६४ इलेक्ट्रान होते हैं। अन्त में रेडान के भीतर ६ तहें पाई जाती हैं। यहाँ ५ वीं तह बढ़कर ३२ इलेक्ट्रान ग्रहण करती है और छठीं तह में ८ इलेक्ट्रान पाए जाते हैं। सब मिलाकर इलेक्ट्रानों की संख्या २+८+१८+१८+३२+८=८६ होती हैं।

हीलियम में पहली पर्त की पूर्ति के लिए २ इलेक्ट्रान चाहिए। बाकी सबके बाहरी पर्त में ८ इलेक्ट्रान होते हैं। भीतरी पर्तें इलेक्ट्रानों से पूर्ण संतृप्त रहती हैं।

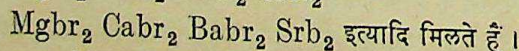
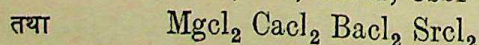
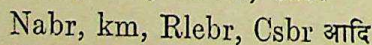
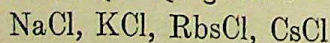
इन पर्तों की कल्पना इतनी सुन्दर सिद्ध हुई कि इन पर तर्कयुक्त विचार करने से हमें तत्त्वों के परमाणुओं की रचना तथा आवर्त-सारिणी में उनके स्थान का पूर्ण ज्ञान हो जाता है। यदि हीलियम स्तम्भ वाले तत्त्वों की पर्तें संतृप्त हैं और लीथियम वाले स्तम्भ में नई पर्त एक इक्लेट्रान से बनती है तो बेरीलियम स्तम्भ के तत्त्वों में उसी पर्त के भीतर दो इलेक्ट्रान पाए जायेंगे। आदान-प्रदान के लिए ये दोनों इलेक्ट्रान उपलब्ध होते हैं; अर्थात् इन तत्त्वों की संयोजन शक्ति २ और परमाणुओं का बन्धन २ होना चाहिए। वास्तविकता यही है। कैल्शियम आक्सीजन से संगठित होता है और कैल्शियम आक्साइड cao बनता है। आक्सीजन में दो बन्धन पाए जाते हैं। अतः कैल्शियम भी द्विबन्धनीय होता है। इसी तरह मैग्नेशियम बेरियम, बेरीलियम, स्ट्रांशियम और रेडियम के परमाणु आक्सीजन के संयोग से अपने आक्साइड बनाते हैं।

साधु गैसों के स्तम्भ के पहले वाले स्तम्भ के तत्त्वों के निरीक्षण से भी ऐसी ही जानकारी होती है। नियोन गैस के पहले फ्लोरीन है। नियोन में दो पर्त है, पहली में २ इलेक्ट्रान और दूसरी में ८ इलेक्ट्रान होते हैं। अतः फ्लोरीन म जिसकी क्रम संख्या ९ है, पहली पर्त सदा २ इलेक्ट्रानों से संतृप्त होती है। किन्तु दूसरी पर्त में ७ इलेक्ट्रान रहेगें तो पर्त की संतृप्ति के लिए १ इलेक्ट्रान की कमी रहती है। इस कमी को पूरा करने के लिए फ्लोरीन किसी ऐसे तत्त्व के साथ जिसमें १ अथवा २ इलेक्ट्रान उसके परमाणु के ऊपरी पर्त में आसानी से उपलब्ध हों, बड़ी सरलता से सोडियम होता है। इसी कारण शीघ्रता से सोडियम, पोटैशियम आदि तथा कैल्शियम, बेरियम, स्ट्रांशियम के साथ यौगिक बना लेता है। फ्लोरीन ही नहीं यही विशेषता ब्रोमीन, क्लोरीन, आयोडीन आदि इस स्तम्भ के तत्त्वों में भी पाई जाती है। हमें सुगमता से—

NaCl, KCl, RbsCl, CsCl

Nabr, km, Rlebr, Csbr आदि

तथा $Mgcl_2$ $Cacl_2$ $Bacl_2$ $Srcl_2$

$Mgbr_2$ $Cabr_2$ $Babr_2$ Srb_2 इत्यादि मिलते हैं।

चूंकि मैग्नीशियम, कैल्शियम, बेरियम आदि द्विबन्धनीय तत्त्व हैं इसलिए प्रत्येक के साथ फ्लोरीन, क्लोरीन, ब्रोमीन आदि के दो-दो परमाणु जुटते हैं। इन क्रियाओं से स्पष्ट हो जाता है कि फ्लोरीन आदि के बाहरी पर्त में एक इलेक्ट्रान का स्थान अवश्य रिक्त रहता है और उसी स्थान को भरने के लिए ये सब तत्त्व अन्य तत्त्वों से जुटने के लिए आतुर रहते हैं। हाइड्रोजन के साथ भी इन तत्त्वों का यौगिक सहज ही में इसी कारण बनता है। हाइड्रोजन

परमाणु में एक इलेक्ट्रान होता है और हाइड्रोजन भी Na, K, Rle, Cs आदि तथा Mg, Ca, Ba, Sr आदि के साथ शीघ्र यौगिक बनता है। हाइड्रोजन परमाणु के सम्बन्ध में हम कह सकते हैं कि इसके इलेक्ट्रानरहित पर्त में एक इलेक्ट्रान के आ जाने से अथवा हीलियम की संतृप्त संख्या २ में एक इलेक्ट्रान की कमी से इसकी संयोजन क्रिया सम्पन्न होती है। उदाहरण के लिए हाइड्रोजन की पर्त २ इलेक्ट्रान से संतृप्त होती है किन्तु इसमें एक ही इलेक्ट्रान है। अतः २ की पूर्ति सोडियम, पोटैशियम, आदि के बाहरी पर्त के एक इलेक्ट्रान से होती है। अथवा क्लोरीन, ब्रोमीन आदि के बाहरी पर्त में ७ इलेक्ट्रान हैं और संतृप्तता के लिए ८ होने चाहिए। हाइड्रोजन के संयोजन से इसका एक इलेक्ट्रान उनके पर्त की पूर्ति करता है।

तत्वों के कई गुणों की व्याख्या इस इलेक्ट्रान वितरण विधान द्वारा दी जा सकती है और उसी के आधार पर आगामी घटनाओं का विवेचन भी इतनी सुन्दरता से किया जा सकता है कि बुद्धि चकित हो जाती है; किन्तु यहाँ स्थान नहीं की इन सबका विवरण दिया जाय। तब भी एक विशेष गुण ऐसा है जिसका उल्लेख परमाणु कहानी के अनुकूल पड़ता है। इसकी थोड़ी चर्चा भी पहले की गई है। बताया गया है कि किस प्रकार परमाणुओं को आयन में बदला जा सकता है और वे विद्युत-क्षेत्र में विचरने लगते हैं। लीथियम, सोडियम, पोटैशियम आदि के बाहरी पर्त में केवल एक इलेक्ट्रान होता है और उसे आसानी से निकाला जा सकता है। इस इलेक्ट्रान के हटते ही इन परमाणुओं का वैद्युतिक संतुलन जाता रहता है। सामान्य अवस्था में केन्द्र का धनात्मक आवेश बाहरी ऋणात्मक इलेक्ट्रानों की संख्या के बराबर होता है। इस एक इलेक्ट्रान के निकलते ही केन्द्र के धनात्मक आवेश की मात्रा एक इकाई अधिक हो जाती है। और परमाणु धनात्मक आयन बन जाता है। इसी कारण Li^+ (लीथियम आयन) Na^+ (सोडियम आयन), K^+ (पोटैशियम आयन) इत्यादि, इकाई आवेश के धनात्मक आयन सुगमता से बन पाते हैं।

यही नहीं, बेरीलियम स्तम्भ के परमाणु द्विबन्धनीय आयन में बदले जा सकते हैं। इन तत्वों के बाहरी पर्त में दो इलेक्ट्रान होते हैं। इनको भी सुगमता से निकाला जा सकता है, यद्यपि उतनी सरलता से नहीं जितनी सरलता से क्षारीय तत्वों के एक इलेक्ट्रान निकाले जा सकते हैं। सचमुच हमें कैल्शियम का Ca^{++} आयन, बेरियम का Ba^{++} आयन आदि सहज ही प्राप्त हैं और इन पर दो इकाई धन विद्युत पाई जाती है।

बोरान के स्तम्भ वाले तत्वों के बाहरी पर्त में ३ इलेक्ट्रान होने चाहिए और इन तीनों के निष्कासन से तीन इकाई धनात्मक आवेश के आयन मिलने चाहिए। वास्तव में हमें अल्यूमीनियम से Al^{+++}, सीरियम का Ce^{+++} आदि आयन मिलते हैं।

फिर तनिक फ्लोरीन, क्लोरिन आदि तत्वों पर विचार कीजिए। इनके बाहरी पर्त में ७ इलेक्ट्रान होते हैं। पर्त की संतृप्ति के लिए ८ इलेक्ट्रान चाहिए। इस रिक्त स्थान में एक इलेक्ट्रान आसानी से आ सकता है। इसके आने से बाहरी इलेक्ट्रानों की संख्या केन्द्र के धनात्मक आवेश से एक इकाई बढ़ जाती है और हमें ऋणात्मक आयन मिलने चाहिए। वास्तव में इकाई ऋणात्मक आवेश के F^-, Cl^- I^- आयन हमें सरलता से मिलते हैं।

इलेक्ट्रानों की पर्त वृत्ताकार पृष्ठ की सतह में दिखाई जाती है। वास्तव में इन पर्तों को त्रिदैशिक गोलाकार प्रदर्शित करना चाहिए। इनको वृत्ताकार सरल निरूपण के लिए वैसे ही मान लिया गया है जैसे कहा जाता है कि सौर-जगत में सूर्य के चतुर्दिक ग्रह वृत्ताकार मार्ग में भ्रमण करते हैं।

परमाणु की केन्द्रीय रचना और केन्द्र के चतुर्दिक इलेक्ट्रानों की पर्तों में नियन्त्रित वितरण विज्ञान की बड़ी ही सुन्दर और अनुपम वास्तविक कल्पना है। लगभग हरएक परमाणु के प्रत्येक इलेक्ट्रान का स्थान भ्रमण वेग और शक्ति आदि का मान यथार्थतापूर्वक निकाला जा चुका है। इनके आधार पर परमाणु के सम्बन्ध में अनेक आगामी गुणों का प्रतिपादन किया गया और सूक्ष्मतर प्रयोगों से उनका समर्थन देखकर चकित होना पड़ा। विभिन्न तत्त्वों के स्पेक्ट्रम भिन्न होते हैं। प्रत्येक तत्त्व अपनी रचना के अनुसार प्रज्ज्वलित करने पर अनेक प्रकार की प्रकाशमान और अदृश्य रश्मियाँ निकालता है। साथ ही इनमें रचनानुसार विभिन्न रश्मियों की शोषण शक्ति पाई जाती है। इन सब का अध्ययन और इनके वर्णपटों की व्याख्या मनुष्य के मस्तिष्क का अद्भुत् चमत्कार है। यह एक अनोखा विषय है। इसे हम इतने ही पर समाप्त करते हैं और पुनः केन्द्र के भीतर जाकर उसकी रचना का अध्ययन करना चाहते हैं जिसके यथार्थ निरूपण से ही परमाणु बम वास्तविक सत्य हुआ।

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मालवीयकाव्यम्

पं० रामकुबेर मालवीयः

अथाष्टमः सर्गः

संप्राप्य सूर्यादिव काशिराजात्प्रभामिवेन्दुर्वसुधां विशालाम् ।
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अगणितगुणमणिकान्तं तिलकीकृतचन्द्रदर्पणं वन्दे ॥३३॥

इत्यष्टमः सर्गः

सत्कल्पनामधुकरीललनाकपोलहासप्रभाधवलिताननमण्डलेन्दुः ।
व्यङ्ग्यार्थसुन्दरसमीरतरङ्गिताङ्गः काव्यारविन्दमकरन्दसुधारसज्ञः ॥१॥
विश्वाभिवन्द्यकविराजधुरन्धराणां पादारविन्दमधुलुब्धमधुव्रतोऽहम् ।
साहित्यतामरससुन्दरगन्धमत्तः श्रीमालवीय इह रामकुवेर एषः ॥२॥

अथ नवमस्सर्गः

एवं गणेशस्मरणेन तस्य चमत्कृता बुद्धिरतिप्रबुद्धा ।
सद्यः प्रसन्ना परिनिष्ठिताभद्गुरूपदेशेन यथात्मविद्या ॥१॥
यदा स धैर्याहितचित्तवृत्तिर्जातस्तदा दैवकृतानुकम्पे ।
आदर्शचित्ते विमले तदीये विचार एकः प्रतिबिम्बितोऽभूत् ॥२॥
एको वदान्योऽस्ति धराधिपानां धर्मात्मनां पुण्यवतां वरेण्यः ।
तारागणानां च यथा सुधांशुर्यथाऽमराणां महितो महेन्द्रः ॥३॥
यः श्रोत्रियब्राह्मणवंशशुद्धमुक्तामणिर्भारतदेशरत्नम् ।
यो राजधानीं मिथिलां प्रशास्ति श्रीमान्स रामेश्वरसिंहराजः ॥४॥
गच्छामि पार्श्वे यदि तस्य राज्ञः कार्यं तदा स्यान्ममसिद्धमेव ।
स ब्राह्मणश्चोत्तमवंशजातो नृपो महीयान्समुदारचित्तः ॥५॥
विद्यानुरागी स निसर्गतोऽयं नराधिपानामपि पूजनीयः ।
तस्यैव साहाय्यबलेन राज्ञो यास्यामि भिक्षार्थमहं पृथिव्याम् ॥६॥
रामेश्वरं श्रीमिथिलाधिराजं विलोक्य सर्वे नरपालसंघाः ।
अत्यादरं हार्दिकगौरवं च प्रदर्शयिष्यन्ति ममापि ते ते ॥७॥
महेन्द्रतुल्येन नृपेण तेन कार्यस्य शोभा विपुला प्रतिष्ठा ।
यथाहि रत्नद्युति रङगुलीये चमत्कृतिं याति नितान्तमेव ॥८॥
यथैव वैशिष्टयमहो नरस्य तथैव भिक्षा मिलति प्रकामम् ।
महार्घवस्त्राणि च कान्तिभाञ्जि प्रभावशालीनि महोज्ज्वलानि ॥९॥
अनुल्वणानि प्रचुराणि येषां ते मानवा आदरभाजनानि ।
रम्यं सुगौरं वदनं हि येषां वाणी मनोज्ञा मधुरा विचारैः ॥१०॥
शास्त्रानुकलावसरे प्रयुक्ता सर्वेष्टसिद्धिं भुवि ते लभन्ते ।
गुणा यदि स्युः किमुतर्हि वाच्यं जातस्सुवर्णेन सुगन्धयोगः ॥११॥
अमुं विचारं दृढनिश्चयेन सम्यक् स्थिरीकृत्य महाप्रतापः ।
नृपस्य रामेश्वरसिंहनाम्नः स राजधानीं मिथिलां प्रतस्थे ॥१२॥

श्रीमालवीयस्वरूपवर्णनम्

अब्धेः पारं विहाराय गत्वा स्नेहान्निर्वर्तितम् ।
यशोहंसं सितोष्णीषव्याजात्स शिरसा वहन् ॥१३॥
लसद्भिस्सुन्दरोष्णीषपटशुभ्रकरोत्करैः ।
ऊर्ध्वं वितानं संतन्वन्नन्यच्छुक्लपटीमयम् ॥१४॥

शुक्लोष्णीषच्छलान्मूर्ध्नि कीर्त्तिनिर्झरिणीमिव ।
मृगाङ्कमुकुटस्येव मस्तके स्वर्धुनीमिव ॥१५॥
पवित्रैः स्वकृतैः कार्यैरम्बुवाहजलैरिव ।
प्रवृद्धामिव सौभाग्यात्पुण्यरम्यतरङ्गिणीम् ॥१६॥
परोपकारवीजेनोत्पन्नां कीर्तिलतामिव ।
मालवीयद्रुमोत्पन्नां यशःकुसुमसंपदम् ॥१७॥
कैलासभ्रमसंक्रान्तां हिमालयसुतामिव ।
वृद्धानां सेवयोद्भूतामाशिषामावलीमिव ॥१८॥
गुरूणां परिपूज्यानामाज्ञां मूर्ध्नि धृतामिव ।
आर्त्तानां सर्वबन्धूनामनुकम्पावलीमिव ॥१९॥
सरस्वतीमतिस्नेहात्स्वयमेवागतामिव ।
शिवपादाब्जसंनत्या विभूतिं संसृतामिव ॥२०॥
भूतलोद्धारसन्नद्धां कृपामिव हरेस्सदा ।
दंष्ट्रामिव महाकायवराहस्य महाप्रभोः ॥२१॥
हृदयस्य विशुद्धस्य बहिर्भूतां छटामिव ।
पताकामिव धर्मस्य सदा मूर्ध्नि समुद्धृताम् ॥२२॥
गौराङ्गपाशबद्धाया मातृभूमेर्जयप्रदाम् ।
स्वातन्त्र्ययुद्धसेनायाः वैजयन्तीं श्रितामिव ॥२३॥
गुणानां विनयादीनां ग्रन्थेस्सुरचनामिव ।
राजनीतेर्निगूढायाः शुभ्रां हासच्छटामिव ॥२४॥
पापानां दुर्मदान्धानां प्रभावप्रतिबन्धिकाम् ।
सुदर्शनस्य चक्रस्य दीप्तिं प्रकटितामिव ॥२५॥
मञ्जूषामिव भूतीनां कल्याणानां निबन्धिनीम् ।
रज्जूं मूर्त्तिमतीं वान्यां भूतलेन्दोः प्रभामिव ॥२६॥
दैवीं किमपरां मूर्त्तिं भूतलेऽत्र समागताम् ।
चित्रयन्तीं जगच्चित्रं वर्णसंभारमन्तरा ॥२७॥
आकाशाद्भूतलं प्राप्तां विद्युच्छक्ति सुपावनीम् ।
सर्वेषामेव नेत्राणां चाकचिक्यप्रयोजिकाम् ॥२८॥
पश्यतामेव सर्वेषां मनसो हारिणीं क्षणात् ।
अपूर्वां चौर्यशक्ति वा कुतः स्थानात्समागताम् ॥२९॥
शेषकायं परिज्ञाय विष्णोरासनमुत्तमम् ।
धृतां मूर्ध्नि हरिं वोढुं शेषकुण्डलनामिव ॥३०॥
दुष्टैरिव हिमैर्म्लानां ततः पीयूषसम्भृताम् ।
प्रसन्नपुष्परचनां रूढामाशालतामिव ॥३१॥
दुःखार्णवनिमग्नस्य सीदतः पुरुषस्य च ।
तारणीं तरणिं साध्वीं दैवादुपनतामिव ॥३२॥

कमलाया हरेश्चापि शयनाय विनिश्चिताम् ।
भक्त्या संधारितां मूर्ध्नि क्षीराब्धिलहरीमिव ॥३३॥

चमत्कृतरुचा भास्वन्मुखश्रियमवेक्ष्य ताम् ।
प्रियसेवार्थमायातां पद्मिनीमण्डलीमिव ॥३४॥

सुन्दरं मुखमालोच्यानारतं तद्दिदृक्षया ।
स्वैरमागत्य संलग्नां संहतिं चक्षुषामिव ॥३५॥

मुखेन्दुं तस्य संवीक्ष्य प्रसन्नमनसां नृणाम् ।
स्मितप्रभाणां रुचिरां प्रतिबिम्बविभामिव ॥३६॥

कामक्रोधादिदुर्वारशत्रुसंतापशान्तये ।
उष्णीषरचनां बिभ्रदातपत्रावलीमिव ॥३७॥

कुण्डलीकृतमार्त्तण्डमण्डलेनेव रश्मिना ।
शुक्लोष्णीषप्रबन्धेनोद्भासयंश्च दिगङ्गनाः ॥३८॥

दन्तव्याजात्करानिन्दोर्धारयन्वदनाम्बुजे ।
पद्मचन्द्रमहाद्वेषं सर्वतः शमयन्निव ॥३९॥

स सौरभेण संयुक्तं मुखं कर्त्तुं रदच्छलात् ।
कुन्दपुष्पाणि संबिभ्रदानने स्वे निरन्तरम् ॥४०॥

दन्तव्याजात्सितां वीणां धारयन्तीं सरस्वतीम् ।
वादनायाबिलम्बं स वासयन्स्वमुखाम्बुजे ॥४१॥

दन्तव्याजात्स्मितज्योत्स्नां बिभ्राणस्स्वानने विधौ ।
प्रतिक्षणं सुधाधारां वर्षन्निव वचः करैः ॥४२॥

महिष्या स्तस्यजिह्वायाः प्रासादमभितः स्थिताम् ।
दन्तप्राकारलेखां स वहन्निव मुखे स्वके ॥४३॥

जिह्वाशुकीनिवासाय दन्तपुञ्जं मुखे दधत् ।
राजतीभिः शलाकाभिर्निर्मितं पञ्जरं किमु ॥४४॥

जिह्वा दन्तावलीं धत्ते माधुर्यार्थं विचक्षणैः ।
पारितोषिकरूपेण दत्तां मुक्तावलीमिव ॥४५॥

जिह्वा द्राक्षालता यस्य मुखोद्याने मनोरमे ।
शुक्लां दन्तावलीं धत्ते फलगुच्छावलीमिव ॥४६॥

प्रयलाय्य गतं चित्तं मिथिलां तज्जिघृक्षया ।
गच्छन्समालवीयस्तां पथि संददृशे जनैः ॥४७॥

॥ इति नवमः सर्गः ॥

अथ दशमः सर्गः

श्रीमालवीयचन्दनटीका वर्णनम्

धर्मात्मानमिमं बुद्ध्वा शरण्यं सर्वदेहिनाम् ।
धर्माकृतिं कलेर्भीतां शरणं संश्रितामिव ॥१॥

तपोव्रतप्रभावैः स्वैर्मस्तके विधिकल्पिताम् ।
मोहादिपङ्करहितां विवेकसरसीमिव ॥२॥
विश्वविद्यालयस्य प्राग्विशाले निजमस्तके ।
रूपरेखां विनिर्णीतामौत्कट्यादुद्गतामिव ॥३॥
यवनाना मिसाईनां धर्मपङ्के निमज्जतः ।
हिन्दूसमाजचक्रस्योद्धारिकां शक्तिमुद्धुराम् ॥४॥
अधर्मोच्चनिनादेन बधिराणां नृणां कृते ।
स्वधर्मोद्घोषणायैव घण्टां रजतनिर्मिताम् ॥५॥
नानाकार्यप्रसक्तत्वं रसनाया विजानतः ।
मौनोपदेशमाख्यातुमपरां रसनामिव ॥६॥
अशोकस्तम्भमालायाः स्थावरत्वविभावनात् ।
जङ्गमे स्वेऽलिके स्तम्भे वर्णमालां कृतामिव ॥७॥
पाश्चात्यमतभक्तानां तथा नास्तिकवादिनाम् ।
प्रतिघातभयादेवश्रुतिं संरक्षितामिव ॥८॥
विषयान्मन आकृष्य हठायोगे निवेशिनाम् ।
कृच्छ्रस्य मोक्षदुर्गस्य सरणिं सरलामिव ॥९॥
संसारे गहने गर्त्ते पततां दुःखभोगिनाम् ।
रज्जुं मूर्त्तिमतीं वान्यामुद्धाराय धृतव्रताम् ॥१०॥
भवान्धकूपमग्नानां जनानां व्यग्रचेतसाम् ।
ज्ञाननेत्रप्रकाशाय दीपस्येवामलां कलाम् ॥११॥
यमपाशैर्निबद्धानामन्यां रक्षामपश्यताम् ।
घोराणां कालपाशानां छेदनायासिचक्रिकाम् ॥१२॥
निर्झरीमिव वाङ्नद्या जन्मभूमिमनोरमाम् ।
गृहीतामादरेणेव सरस्वत्याः प्रसन्नताम् ॥१३॥
मुखचन्द्रं प्रियं दृष्ट्वा प्राप्तं सूर्यभयाद्भुवि ।
तत्स्वागतार्थमायातां भक्तिकैरविणीमिव ॥१४॥
प्रत्यहं कार्यं मार्गेषु नानाकण्टकरूपिणाम् ।
भयसंशयजालानां दूरीकरणमार्जनीम् ॥१५॥
सितचन्दनटीकां तां वहन्तं निजमस्तके ।
शिवस्य पूजासंक्रान्तां शुक्लां चन्द्रकलामिव ॥१६॥
मिथिलां प्रति गच्छन्तं मालवीयं नरोत्तमम् ।
दृष्ट्वाश्चर्येण जनता चक्रे विविधकल्पनाम् ॥१७॥
मालवीयद्विजस्यास्ये तिलको वर्तुलः सितः ।
जातिप्रीत्येव संलग्नो द्विजराड्बालचन्द्रमाः ॥१८॥
गुणज्ञो निर्गुणं हित्वा हरमर्धेन्दुशेखरम् ।
कलङ्करहितः पूर्णः संसक्त इव चन्द्रमाः ॥१९॥

अधर्मोत्पातशमनं मण्डलं ज्योतिषामिव ।
प्रशान्तवृष्टयावरणः शरत्कालाम्बुवाडिव ॥२०॥

तस्या जातशत्रुत्वशिक्षाग्रहणवाञ्छया ।
भालं चन्द्रात्मकं प्राप्तं पुण्डरीकं हरेरिव ॥२१॥

महाभारतयुद्धान्ते बुद्ध्वा कृष्णेन निष्फलम् ।
न्यासीकृतमिव स्थाने पाञ्चजन्यं पुरातनम् ॥२२॥

बन्हिनेव प्रचण्डेन शमेन प्रबलात्मना ।
क्रोधादिदाहसम्भूतस्समूहो भस्मनामिव ॥२३॥

विद्याक्षीराब्धिमन्थोत्थस्थूलबिन्दुरिवागतः ।
पवित्रमुखचन्द्रेऽस्मिन्प्राप्तोऽङ्कः शुक्लतां किमु ॥२४॥

हेत्वाश्रया गुणास्सर्वे कार्यमायान्ति निश्चितम् ।
पुष्टः प्रतीयतेऽत्रैव सिद्धान्तोऽयं मनीषिणाम् ॥२५॥

यत्सितीकृतविश्वस्य यशसोऽद्भुतशाखिनः ।
शुक्लं बीजं महोत्कृष्टं किमारोपितमादरात् ॥२६॥

चन्द्रबिम्बं रजन्यन्ते परिपाण्डु मनोहरम् ।
आदित्यमण्डलत्रासाद्भजते किं परं रविम् ॥२७॥

कामक्रोधेन्धनं ज्योतिः स्नेहाभावेऽप्यचंचलम् ।
दीपं त्रिभुवनाज्ञानध्वान्तस्य विनिबर्हणम् ॥२८॥

शिवं विप्रस्वरूपेण कृपया भूमिमागतम् ।
वीक्ष्य मन्दारलतया स्वकीयं पुष्पमर्पितम् ॥२९॥

भूमौ नराणां क्षेमार्थमानीत मात्मना सह ।
पीयूषपात्रं धवलं राजतं मन्मथारिणा ॥३०॥

किं परार्थमहारम्भश्रमोत्थाप्पृषतां चयः ।
शुष्कतां यो नचायाति रात्रावपि दिवापि च ॥३१॥

मालवीयकृतं कार्यं दृष्टवा लोकानुरञ्जनम् ।
किं सुमं पारिजातस्य हर्षादिन्द्रेण पातितम् ॥३२॥

द्विजिह्वैरेव परितश्चाक्रान्तां मलयस्थलीम् ।
त्यक्त्वा भयात्समायातं भालेऽस्मिञ्चन्दनं किमु ॥३३॥

तपोवृक्षस्य किं त्वेकं शुक्लं किसलयं परम् ।
इदं किं शुक्तिपुटकं गुणमौलिकसम्भृतम् ॥३४॥

मन्दिरं देवतानां च विलिप्तं सुधया किमु ।
मध्येनेत्रं धृतं भक्त्या तस्य नित्यदिदृक्षया ॥३५॥

कातर्यं भयनिश्वासान्धत्वशून्यं विनारजः ।
उत्साहवारिणामृष्टं सद्दर्पणमिवस्थितम् ॥३६॥

आरोपणाय सर्वासु जनहृत्क्षेत्रभूमिषु ।
हिन्दूप्रेमलताबीजभाण्डारमिव रक्षितम् ॥३७॥

पुराणैर्मुनिभिस्सम्यक् पूर्वजैः परिपालितम् ।
वेदकल्पलतामूलं सालवालमिव स्थितम् ॥३८॥
शुक्ले गुणेऽधिकां प्रीतिं मालवीयस्य वीक्ष्य ताम् ।
कृष्णेन स्वपदाम्भोजं कृपया धवलं कृतम् ॥३९॥
तच्छुक्लं कृष्णपादाब्जं नित्यं ध्यात्वास्थिरीकृतम् ।
भालमध्ये धृतं भक्त्यस्र तिलकच्छद्मना किमु ॥४०॥
भक्तिपूजाविधीनां तत्सौविध्यायानुकम्पया ।
शिवस्य स्फाटिकं लिङ्गं स्वयं पार्श्वमुपागतम् ॥४१॥
सुगन्धिंचन्दनगुणं जगदानन्द कारकम् ।
मन्ये शुल्कं नवोद्भूतं तृतीयं ज्ञानलोचनम् ॥४२॥

॥ इति दशमः सर्गः ॥

SYNTACTICAL SIGNIFICANCE OF CASE-ENDINGS IN SANSKRIT

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चत्वारि शृङ्गा त्रयो अस्य पादा द्वेशीर्षे सप्तहस्तासो अस्य ।
त्रिधा बद्धो वृषभो रोखीति महो देवो मर्त्यां आविवेश ।।
(ऋग्० वेद—४।५८।३)

All the words of the Sanskrit language can be classified into four categories नाम, आख्यात, उपसर्ग and निपात. But after a more accurate consideration this classification will appear quite vague. If we consider declinableness of words, उपसर्ग and निपात will make one separate class and नाम and आख्यात the next, subdivided into themselves. So far as the inherent nature of the words called नाम, उपसर्ग and निपात is concerned, all these seem to belong to one class and आख्यात to the other. *Pānini* also seems to be of the same opinion. We get a line like this "अपदं न प्रयुञ्जीत" i.e. according to Pāṇini a word, which has not attained the stage of पदत्व has got no syntactical significance in Sanskrit, पदत्व has been characterised by him as सुप्तिङन्तं पदम् (*Aṣṭādhyāyī* 1/4/14). All the words with सुप् and तिङ terminations are entitled to be called पद. Taking into consideration the rule अव्ययादाप्सुपः (*Aṣṭā.* 2/4/82) निपात and उपसर्ग also can be understood to be included in the class of सुबन्त or नाम. Hence we see that wider classification of words can be made into two classes नाम and आख्यात or सुबन्त and तिङन्त.

As भट्टोजिदीक्षित says in his *Manoramā*[1] "प्रकृतिप्रत्ययविभागः—तत्तदर्थविभागश्च सर्वः कल्पित एव; परमार्थतस्तु स्फोट एव अर्थवान् ।" and as we see in *Vaiyākarana Bhuśanasāra* of Kauṇda Bhatta-"वाक्यस्फोटोऽतिनिष्कर्षे तिष्ठतीति मतस्थितिः ।,"[2] the sentence is the unit of language. Words are inadequate notations in themselves,

[1] On the Sūtra अर्थवदधातुरप्रत्ययः प्रातिपदिकम् स्फोट एव अर्थवान् (1-2-45)
[2] Vide Kārikā 61 in *Sphotanirṇaya*

to express human ideas. A particular combination of words, rather terms, alone is sufficient to communicate our ideas. No doubt in telegraphic language our purpose is served by words without the help of sentences. But it will not be called wisdom to say like that. Apparently there is no sentence in a telegram; but we cannot deny the fact that we can understand nothing from it unless and until we add same additional terms to construct a sentence. we should not foreget the well-known dictum. "येन विना यदनुपपन्नं तत्तेनाक्षिप्यते।"

It is an undisputed fact that sentence construction is the most essential factor of a language. The constituent parts of a sentence in Sanskrit are नाम and आख्यात or सुबन्त and तिङन्त. The syntactical relations of terms in a language are studied in an important branch of comparative philology namely Syntax. Every language evolves various devices to show the mutual relations of words in a sentence. Sanskrit language is not an exception to it. In Sanskrit Grammar this matter has ben tackled under two heads, namely विभक्त्यर्थ and लकारार्थ. All the विभक्तिs and लकारs denote some specific meaning. As the limited number of alphabets serves the purpose of the whole bulky literature of a language and as the limited sounds serve the purpose of an unlimited range of the human vocal power, so these limited विभक्तिs and लकारs also serve the purpose of what is required to express one's idea through the medium of the Sanskrit language.

Case-endings and root-endings are simply notations. A particular of these enables the stems to denote a particular meaning which one intends to put forth. Terms change their meanings in different contexts. In a sentence when we begin to determine the meaning and position of a particular term we have to take all other constituent parts of that sentence as its background or to say more accurately, its context.

In the present essay the syntactical relation of case-endings, as propounded in Pāninian Grammar is, mainly to be dealt with. A word with a सुप्प्रत्यय (case ending), in a sentence, gets all other words of that sentence as its context

and in this context this particular case-ending indicates its genuine meaning. Other words are to determine the proper case-ending of a word in a particular context. To be more precise, we have to think in what context पञ्चमी should be enjoined and in what context तृतीया, and so on. *Pānini* has used many devices in this direction. The words whose meanings are construed with verbs directly and sometimes indirectly have been assigned विभक्तिs through the कारक. *Kārakas* are the media, merely, to assign case-endings. They determine case-endings only where there is any connection of the meaning of the word concerned with a verb. Limited number of *Kārakas* is merely one of the determining factors or one of the devices to determine a particular विभक्ति in a particular context.

For this, *Pānini* has tried to define all the *Kārakas* in the fourth *Pāda* of the Ist *Adhyāya* of his *Aṣṭādhyāyī*. According to what he takes for *Kārakas*, the meaning of a word can be construed with the verbs in only six ways and every one of them signify one *Kāraka*. Hence the number of *Kārakas* are six according to *Pānini* i.e. अपादानम्, सम्प्रदानम्, करणम्, अधिकरणम्, कर्म and कर्त्ता.

The number of *Kārakas* is a matter of great dispute among different grammarians. In the opinion of some scholars[1] सम्प्रदान and अपादान are not genuine *Kārakas*. They give reasons for this that a word which has the capacity to be कर्त्ता can only be be a genuine कारक e.g.

(i) ओदनः स्वयमेव पच्यते ।
(ii) असिश्छिनत्ति । and
(iii) स्थाली पचति ।

These are the examples of transformed कर्त्ता from कर्म, करण and अधिकरण respectively. In favour of this view one more argument is put forth, that the word *Kāraka* is derived from the root कृ to do, therefore, only कर्त्ता, कर्म, करण and अधिकरण are *Kārakas* due to their being derived from कृधातु, सम्प्रदान and अपादान are not so.

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[1] व्याकरण दर्शनभूमिका पृष्ठ २०८

These evidences are alright. But if criterian differs, the number of *Kārakas* will certainly differ. The underlying principle propounded above by some scholars is not the same as that which has been adopted by *Pānini*. He takes क्रियान्वयित्वम् कारकत्वम्.. If this definition is taken into consideration we are sure to have six *Kārakas*. No body can gainsay the fact that the word *Kāraka* is a technical term and the meaning obtaind from derivation should not be entertained here; becuase as it is derived from ण्वुल्प्रत्यय, it should be कारकः like कर्त्ता, पक्ता and पाचकः, but it is found everywhere, in नपुंसकलिङ्ग. It means that the word *Kārakam* has got its own meaning and *Kāraka* can be subdivided into various categories. Therefore, there is no chance of prejudice regarding the number of *Kāraka*.

Kāraka does not serve the full purpose of establishing syntactical relations of the words. *Pānini* has adopted another device by which he has enjoined द्वितीया, पंचमी and सप्तमी case-endings at some places through कर्मप्रवचनीय संज्ञा[1]. The meaning of some words in a sentence are not construed with the verb, but with the meaning of some other words which resemble *Upasarga*. In this case some words resembling *Upasargas* in some particular sense have been named कर्मप्रवचनीय and through it we get विभक्तिs accordingly. The most remarkable point here is that Sanskrit being a synthetical language, resembles in this aspect with one of the analytical languages namely English. In English, when we parse a noun or a pronoun, sometimes, we have to mention, governed by the preposition ......'. This phenomenon of nouns being governed by a preposition or a verb is clearly visible in Paṇinian grammar.

There are two more wonderful devices to solve the problem of establishing the syntactical relations. Those are prescribed by the sutra अनभिहिते[2] and अकथितञ्च[3]. Either of the two requires a separate article for their proper evaluation.

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[1] *Aṣṭādhyāyī* 1. 4. 83.
[2] Ibid 2. 3. 1.
[3] Ibid 1. 4. 51.

In spite of all these devices if some cases are left out, they come under the jurisdiction of षष्ठी शेषे[1] which falls under no *Kāraka*. प्रथमा is also enjoined under no *Kāraka*. In the end syntactical relations can be divided under the following heads :—

(i) Nouns related to verbs
(ii) Nouns related to *Upasargas*
(iii) Nouns related to adverbs other than कर्मप्रवचनीयऽ as अन्तरा etc.
(iv) Nouns related to nouns. e.g. राज्ञः पुरुषः ।
(v) Nouns related to none i.e. absolute case.[2] e.g. कृष्णः, श्रीः, ज्ञानम् ।

This classification seems to be more scientific and more *Pāninian*. *Kātyāyana*, who supplements *Pānini* by his *Vārttika*, also supports this view.

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[1] Ibid 2. 3. 50.

[2] प्रातिपदिकार्थलिङ्गपरिमाणवचनमात्रे प्रथमा । (Asta 2. 3. 46.)

'ETHICAL THOUGHT IN RECENT INDIAN PHILOSOPHY'

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Ethics has been an important concern with civilised people in all ages and climes. In India particularly the study of moral life has always been regarded as being of supreme importance, since it is directly relevant for man's social life and his happiness. But in modern India, ethical thought has become different both in content and emphasis from ancient moral teachings; it has, not unnaturally, been coloured by the cultural needs and prejudices of the new India. It has also been affected by our cultural contact with the West where moral and social life has been accorded higher status in terms of man's ultimate values.

As a result, social life and social morality have become very important in modern times. In fact, the "Renaissance of Hinduism" started with emphasis on social reform. It began with the agitation of Raja Ram Mohan Roy for the abolition of *Sati*. *Brāhma-Samāj*, *Prārthanā-Sāmāj* and *Arya-Samāj* all aimed at the removal of social evils that had entered Hindu Society. It was due to them that several evil customs of the Hindu society, e.g. *Sati*, Infanticide, enforced widowhood, child-marriage, *devadāsi*, *purdah*, prohibition of foreign travel and the like, came gradually to disappear. Gandhi's campaign against untouchability is the greatest service he has rendered to Hindusim in the modern period as it was the greatest curse eating into the vitals of Hinduism. Gandhiji declared untouchability to be a heinous crime against humanity. He worked hard for the cause of Harijan welfare. It is due largely to him that untouchability has now been declared to be a legal crime. Mahatma Gandhi also denounced vehemently the injustice done to women in Hindu society. He says," I am

uncompromising in the matter of Woman's rights. In my opinion, she should labour under no legal disability not suffered by man. I should treat the daughters and sons on a footing of perfect equality". Gandhiji even objected to the expression "the weaker sex". He was of opinion that social and economic reforms must go hand in hand with political reform.

Modern Indian thinkers are showing greater interest in the life on this earth. As a consequence, life of action is preferred to life of inaction. The path of renunciation and asceticism must be given up. There is a revival of interest in the doctrine of *Karma-yoga* taught by the *Bhagwad-Gītā* according to which spiritual freedom can be attained by living in this very world provided we discharge our duties without desire for their rewards. This emphasis on action is already visible in the teachings of Vivekananda. In his *Karma-Yoga* he declares: "Each duty has its own place and according to the circumstances in which we are placed, must we perform our duties". He believes that "By work alone men can get to where Buddha got largely by meditation or Christ by prayer". This emphasis becomes more and more pronounced in the teachings of Tilak and Gandhi. Gandhiji was a *Karma-Yogin par-excellence.* That is how he applied the great principles of truth, love and nonviolence to politics, economic questions and other social fields. Gandhiji was primarily a man of action and it can very well be said that "The life of Mahatma Gandhi is the best modern commentary on the Bhagwad-Gita, as he was the embodiment of the ideal *Karma-Yogin* described in that scripture". Dr. Radhakrishnan also declares, "Morality is not merely a question of laws and convention but one of purity of mind with action as out-ward manifestation." In his *Eastern Religions and Western Thought* he answers very accurately the criticism that Hindu ethics teaches in action and that in it there is no emphasis on outer activity. Although Tagore is said primarily to be a man of letters, yet his life of adoration and prayer does not make him a *Samnyasin.* He seriously condemns asceticism and quietism. According to

him, God is a worker and if we love Him, we must work with Him. In the last chapter of *Sādhanā* he puts the whole teaching of the *Gita* in a nutshell when he says, "Where can I meet thee, unless in this my home made thine ? Where can I join thee, unless in this my work transformed into thy work ? If I leave my home, I shall not reach my home. If I cease my work, I can never join thee in my work". Shri Aurobindo attaches greater importance to action, than did the older vedantists. Thus greater emphasis is laid on the need of social action and service of man. Swami Vivekanand, Gandhiji and Tagore always tried to emphasize the fact that sprituality does not consist in turning our back to the problems of poverty, ignorance and misery. There must be an effort to up-lift the down-trodden. "Hate the sin and not the sinner", was the call of Mahatma Gandhi. The lowest of the low must be helped to rise higher.

We must work, but with a spirit of detachment. The teaching of the Gita कर्मण्येवाधिकारस्ते मा फलेषु कदाचन must be strictly followed. Work must be for work's sake. All desires for material possesion must be abandoned. The secret of work according to Swami Vivekanand is non attachment to work. "Work, but let not the action or the thought produce a deep impression on the mind..." We must work like masters and not like slaves.

So we see that moral life or life of moral action has become very important now. In ancient times ethics and metaphysics were blended together. Moral life and ethical thought were regarded not so much as ends in themselves as means for achieving Salvation, *Mokṣa*. Now ethics is no longer considered a part of metaphysics. Its study is important for the up-liftment of individual and society in this world and not simply as a means to attain salvation. It prepares a man to live in this very world. Together with this, religion has also been freed from the mythological, ritualistic and sociological forms that surrounded it. More emphasis is laid on Indian philosophy than on mythology or rites or ceremonies. Swami Viveka-

nanda and Dr. S. Radhakrishnan have given true interpretation of the *Vedānta* as a religious philosophy independent of any rites or ceremonies.

In modern times, ethics is not only limited to social field : it has been brought to politics also. In the 19th, century and in the beginning of 20th, century India was struggling hard to attain political independence. Naturally the prophets of this period were inspired by patriotic feelings. Most of them—Tilak, Aurobindo, Gandhi and Radhakrishnan-have been actively participating in political activities and thus it is natural that their moral teachings should extend to the field of politics also. Mahatma Gandhi, the architect of India's freedom, was chiefly responsible for bringing together ethics and politics. He declared, "I am trying to introduce religion into politics" Again he observed : "Many of my political friends despair of me, because they say that even my politics are derived from my religion. I go further and say that every activity of a man of religion must be derived from his religion, because religion means being bound to God." Religion according to him does not mean customary religion but religion based on morality and moral principles. To avoid immoral practices, e.g. untruth, fraud tyranny, crime, oppression etc. that are usually committed in the name of the state, he condemned secrecy in political activities. He got political freedom, for India, but he preferred Truth to Swarāj. He introduced the powerful weapon of Satyāgraha in political struggle. Explaining his own attitude to politics Gandhji wrote : "I have no secret methods. I know no diplomacy save that of truth. I have no weapon but non-violence". Other religious teachers like Rama Krishna and Swami Vivekananda while asking their disciples to engage in humanitarian service, did not encourage their participation in politics yet. As Vincent Sheean has remarked"....the Ram Krishna Vivekananda movement...although it was never political...had vast political effects not included in its conscious programme. The call to reform, restore and revive India, to help India in every

possible way for human effort, was essentially Vivekananda's call. and of all the makers of modern India, his was the most classless and purely patriotic voice. Thus, even if political activity is avoided, the political results of the activity cannot be avoided. Tilak was really the generator of a nationalism which had yet to seek and find its proper basis in Truth and Non-violence and so he may also be said to have tried to introduce ethics into political field. For one thing, long before Gandhiji preached his gospel of non-co-operation. Tilak in one of his speeches as early as 1907 had set before the nation the whole programme of non-co-operation.

The prophets of this period have thus by their actions and teachings raised the status of India among the countries of the world. We need not borrow ethical ideas from foreign countries as our ancient scriptures, particularly the *Bhagvad-Gītā*, are rich enough to supply all the ethical concepts that are needed today. In recent times there has been a revival of interest in the teachings of the *Gītā* as is clearly shown by commentaries written on it by Tilak, Aurobindo and Radhakrishnan. Mahatma Gandhi was the great admirer and follower of the *Gītā*. He said, "I must confess to you that when doubts haunt me, when disappointments stare me in the face and when I see not one ray of light on the horizon, I turn to the *Bhagvad-Gītā* to find a verse to comfort me ; and I immediately begin to smile in the midst of overwhelming sorrows". Besides, Indian ethical thought has been taken over to the Western nations also. Swami Vivekananda and Dr. Radhakrishnan are mainly responsible for carrying the message of Hinduism to the West. As a result, foreigners are becoming more and more interested in the study of Indian ethics.

No doubt, the greatness of the Hinduism has been reaffirmed but together with this, as is naturally expected the moral teachers of renascent India have re-asserted firmly their faith in the fundamental principle of Hinduism that all religions are on equal footing like different branches of the

same tree and so there need not be any conflict among religions. Real religion must be based on morality and it is this moral aspect of religion that mainly accounts for the unity of different religions. Gandhiji says, "It is clear, therefore, that true religion and true morality are inseparably bound up with each other...there is no religion higher than Truth and Righteousness." Ramkrishna Paramhansa was an unwearied experimenter in religion. He practised different religions and then came to the conclusion. "I have found that it is the same God towards whom all are travelling, only they are coming through diverse ways". To Gandhiji, there was no difference between Christ's 'Sermon on the mount' and the *Gītā*. Both gave him equal inspiration and delight. He also uttered Kalma regularly. Over the door of Santiniketan, the home of Tagore, runs an inscription, not only "In this place no image is to be adored", but also "And no man's faith is to be despised". Dr. Radhakrishnan is also very hopeful about this unity in different systems of thought. He says, "Unconsiously perhaps, respect for other points of view, appreciation of the treasures of other cultures, confidence in one another's unselfish motives are growing. We are slowly realizing that believers with different opinions and convictions are necessary to each other to work out the larger synthesis which alone can give the spiritual basis to a world brought together into intimate oneness by man's mechanical ingenuity". Thus, by asserting unity of different points of view they have tried to bring union in Indian Society. So that people of different creeds and castes may live unitedly.

Modern Indian ethical thought has also been influenced by Christianity. The emphasis on social service by modern religious teachers, specially those belonging to *Samaj* movements and *Ramakrishna mission*, was chiefly due to the influence of Christian missions. *Ramkrishna Mission* was established following the example of the Christian missioneries. Raja Ram Mohan Roy was deeply interested in Christian ethics so much so that he brought together the ethical ideas contained

in the New-Testament in his *Precepts of jesus*. He said, "I feel persuaded that by separating from the other matters continued in the New-Testament, the moral precepts found in that book, these will be most likely to produce the desirable effect of improving the hearts and minds of men of different persuations and degrees of understanding". Mahatma Gandhi sees no difference between the *Gita* and the 'Serman on the Mount.' He declares, "Today, supposing I was deprived of the *Gita* and forgot all its contents, but had a copy of the Sermon, I should derive the same joy from it as I do from the *Gita*".

In this way, we see that the concept of internationalism is gradually becoming more and more important. The leaders of modern India have tried their best to bring East and West together. We need not copy western culture and ethics but we must appreciate their good points. The whole of humanity must be regarded as one indivisible undivided family and so East and West must help each other, so that the human race may live a better life on earth. They must love each other and try to learn from each other, instead of hating one another. Swami Vivekananda says, "It is also fitting that when the Oriental wants to learn about machine-making he should sit at the feet of the Occidental and learn from him. When the Occidental wants to learn about the spirit, about God, about the Soul, about the meaning and mystery of this universe, he must sit at the feet of the Orient to learn". Mahatma Gandhi declares, "I am humble enough to admit that there is much that we can profitably assimilate from the West".

One of the tasks before the leaders of the Renaissance was to adjust the teachings of Hinduism to scientific thought. In this modern age of science there has been significant change in man's ideas regarding the earth and the heaven, the individual and the society. Hence, the need was to re-interpret our ancient philosophical systems in the light of modern changed outlook. Science and morality or spirituality need not be distinct from each other. Swami Vivekananda is of opinion, "I have seen some scientists who were equally practical, both as scien-

tists and as spiritual men, and it is my great hope that in course of time the whole of humanity will be efficient in the same manner". Dr. Radhakrishnan in his "*The Reign of Religion*, and "*An Idealist view of life*" reviews all the contemporary scientific and philosophical systems of the west in the light of the *Vedānta*, and also interprets the latter in relation to them.

Besides this re-interpretation of the ancient ethical teachings with a view to giving them wider application and to arousing the interest of foreigners in their study, another great contribution of the modern renaissance leaders has been in the form of answering the criticisms of Hinduism and Hindu ethics by western thinkers. In *Eastern Religions and Western Thought* Dr. S. Radhakrishnan has critically examined the account of Indian Thought as given by Dr. Schweitzer. Hindu thought, according to Schweitzer, is not sufficiently ethical as it tends towards world and life negation. He is of opinion that the Hindu doctrine of Māyā regards this world as an illusion, so that ethical life is no longer needed. Radhakrishnan's reply to such criticism is as follows. "No doubt Hindu thought does not recognise this world to be the ultimate reality and believes that there is something beyond this world of senses and that man truly belongs to another order. The highest aim of man is to get release from this endless cycle of birth and death. But it does not mean life-negation or inaction. The fact is that it is the consciousness of a spiritual universe that gives this world its life and significance. We must work in this world, says Hindu ethics, but always having the high ideal before our mind". The *jnāni* or the seer does not abstain from the work but does it with his eyes fixed on the eternal, and so "It is improper for man to remain without sharing in the work of the world even when God assents to work for the universe". We need not renounce the world; on the other hand detachment of spirit is needed. As to the criticism of Schweitzer that "Brahmanic mysticism has nothing to do with ethics being thoroughly Suprea-ethical," because the ideal man here is raised beyond the ethical distinction of good and evil,

Radhakrishnan says that this view is based on a misunderstanding. When it is said that "sin does not cling to a wise man" it does not mean that he is free even if he commits sin. The fact is that a person who is free from worldly attachements cannot commit sin as he no longer remains an agent or enjoyer. So the Hindu religion is very much ethical. In this way Dr. Radhakrishnan has very ably tried to clear the misconceptions regarding Hindu thought in the minds of westerners.

The leaders of modern Renaissance of Hinduism have made great contributions to Indian ethical thought. They have shown that life must be lived morally not only in private and social spheres, but also in political and international realms. The moral virtues of Truth, Goodness, Love and Non-violance must be practised in all the fields of human action. The feeling of Universal Brotherhood must be inculcated and East and West must try to understand each other better. We must try to establish paradise on earth as well as try to realize the paradise of spirit.

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WAX MODELLING AND LOST-WAX PROCESS OF METAL CASTING

[A COMPARATIVE STUDY OF SOUTH INDIAN AND BANĀRAS METHODS]

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Historical background :

Wax modelling and the lost-wax process of metal casting, has a long history. In many parts of the ancient world, the earliest waxes and other objects in metal, were cast in open moulds of stone or baked clay. Later two piece moulds came into use, with core-pieces for sockets where required. From many Bronze, and early Iron Age sites in many parts of the world, piece moulds of stone, burnt clay and bronze have been recovered, and fine examples of bronze-casting abound.

We have but to look at the splendid figure, of the dancing girl from Harappa, the Sultangunj Buddha to realise that these founders were complete masters of their craft. A fine head from Ninevah of Sargon king of Akkad, is probably the earliest surviving life size portrait head in cast Bronze. On the walls of the tomb of Rekhmirey prefect of upper Egypt in the reign of Amenhetep II (c. 1440 B.C.) there are paintings, showing the casting of copper doors for a temple. In many hollow cast statues from Egypt, there are cores of sandy material containing blackened organic matter which bound it and gave it porosity. Actual piece moulds in which bronze vessels have been cast, of Shang Yin Dynasty (c. 1766-1122 B.C.) have recently been discovered. We have examples of metal figures such as the headless statue of Queen Napir-asu, consort of Ountash-gal a cassite king of c. 1300 B.C. The pair of bronze "Barrieres" in Louvre, inscribed with the name of Shilk Hak-in-Shushinak, King of Susa demonstrate the skill of founders of the eleventh

century B.C. We have another description, from the inscription of king Sennacherib of Assyria, of the figures decorating his palace. The earliest literary reference to the art of Image making in South India is to be found in the Tamil classic, *Silapadi-Karam* (about 2nd century A.D.) In India this art is hereditary and has been confined to a few families in the cities like *Tanjore*, *Madurai*, *Tirunelveli*, and *Swamimalai* near *Kumbakonam* in south India. In the north you find it at *Varanasi*. In South India the Sthapathis reckon themselves equal to Brahmins. In the North they do not claim equal status to Brahmins.

The term metal casting comes within the Province of Technology as well as of Art. The Cire perdue or lost-wax process is a method of casting in metal by means of an external mould in one piece, from which the wax of the model is removed by melting, and the moulten metal poured into it. A model, if small, may be cast solid, but for a hollow cast a core, or mould for the internal surface of the metal, must be provided. The model can be prepared solid in wax, or over a previously prepared core. Failing that a complete piece-mould in plaster or some flexible material, such as geletine, is made, into which a layer of wax of the thickness required for the metal is painted or poured. Inside the wax layer, the core of clay and pounded brick or other infusible material is formed. It should be provided with suitable vents. The temporary mould is removed, and then a complete system of runners, through which the metal flows from the pour to all parts of the mould, and of vents by which the air may escape, is built up of rods of wax. They are arranged to incline in one general direction, for each piece of wax must be so placed, that it will drain out of the mould on melting. The wax system being completed, a thin layer of fine clay is painted over it, and further layers, now mixed with powdered brick or other material to afford porosity, are added until the mould is of sufficient thickness. Iron wires may be bound round if necessary. The complete external mould is thus built up in one piece. It is placed in an oven in such a

position that all wax may escape when heated. The mould is then baked and is ready for the metal. When this had been cast the mould is broken off, all runners and vents (now in metal) are removed and the rough surfaces are chased and finished.

The lost-wax method or Cire perdue (*French*) is termed *Madhuchchhiśtavidhān* in Sanskrit. There are two methods of casting. The hollow method and the solid. We get descriptions about the method of modelling and casting in *Silpasastra Mānasāra*, and *Abhilasitārthachintāmani* or *Mānasollāsa*. It is still a living art and is practised in many parts of India. The *Sthapathis* of South India have kept alive this ancient art, both in the matter of technique, and as regards iconographic cannons.

Bee wax, Amber or Ral (*Hindi*), oil are the *principal* ingredients used in the process for modelling. Clay, Cowdung, Rice husk, Cotton and some other asbestos materials, are used for moulding. Brass, Copper and Bronze are the principal metals generally used in casting.

South Indian Process

Materials and methods :

A study of the South Indian method of bronze casting was done by the writer in the bronze production centre at Bangalore under the all India Handicrafts Board with the help of the Teacher's Study Tour Grant of the U.G.C. in the year 1963.

(i) *Ingredients used for modelling*

(1) Bee wax
(2) Black soot (for giving black colour to the wax)
(3) Castor oil.

Method of modelling.

The artists who work in the bronze production centre are all traditional craftsmen. They are engaged in making replicas of old South Indian bronzes. No original creations are attempted.

Bee wax of the required quantity is put in an open vessel and heated. When the wax melts and turns liquid, black soot

is added to it and stirred. The craftsmen of Bangalore use only this medium for their modelling. It seems that the workers in Swamimalai near Kumbakonam in South India add castor oil and amber to give strength to the wax. The climatic variations have something to do with the kind of media used. Since pure wax figure get warped due to heat in summer, oil and ral are added to it. Bangalore being a cool place, this is not done. The wax mixture is allowed to cool a little. It is then removed and made into a panel according to the size of the figure to be prepared. The figure to be prepared is drawn over the wax. Then the modelling starts. At first the front portions are modelled. When the required heights of different parts are reached the figure is cut out of the panel in order to model the back portions. Along with it the required twists and turns are also given to the figure. Since wax gets set quickly the figure is heated a little to soften it during the process of modelling. The wax that is added is also heated. In order to heat the wax a small charcoal oven and an oil lamp are used. At times the metal tools used for modelling are also heated. The South Indian craftsman does not aim at a fine finish of the figure. He does the main modelling only and leaves the rest to be finished on the metal cast by chasing and finishing. During the process of modelling the artist inserts wax rods at convenient places and arranges them in such a way to incline in one general direction in order to drain out the wax at the time of casting. These bridges of wax are necessary for the molten metal to flow to the delicate parts and as well as for vents. When the whole modelling is finished moulding starts.

Materials for moulding :

(1) Burnt clay (removed from used moulds). This is ground and sieved to a fine mesh.
(2) Jute cuttings (asbestos).
(3) Cow dung.
(4) Rice Husk.
(5) Sand.
(6) Ordinary red plastic clay.

Method of moulding :

Burnt clay, jute cuttings, cow dung all these are ground together to a butter-like consistency in mortar and stone. Sufficient quantity of this medium is prepared in a single lot in order to enable the quality of the paste to be even throughout. This fine paste is evenly applied all over the figure. It is allowed to dry thoroughly in the shade. After this a second coat prepared out of red clay and fine sand is applied. This is left to dry completely. By now the mould gets sufficient thickness. Two thick wax rods are inserted at the bottom of the figure to make passages for the pouring of the molten metal and for the raiser. Iron bindings are fixed at various points around the figure for reinforcement. Then the final coating or mantle is applied. It is allowed to dry completely for a number of days till the mould is bone dry. If any crack appears on the mould it is rectified with the same clay.

Method of casting :

The mould along with the wax figure is heated on a hearth made of cow-dung. When the mould gets sufficiently hot, the wax inside melts and starts flowing out. It is collected in a vessel containing water so that it can be used later. After removal of the entire wax from the mould it is further heated till it gets red-hot inside, and gives out a glow. Side by side with the heating of the mould, the metal required for pouring is also melted. When the metal turns liquid, borax is thrown over it to clean it. The heated mould is slowly lifted, and placed over a heap of sand. When all is set, the metal is carefully lifted from the fire, and poured inside the mould. When the metal starts coming through the vents, they are plugged. When the metal over-flows or fills to the brim of the raiser, pouring is stopped. The mould is left to cool. When completely cool, the mould is broken and the figure is removed.

Chasing and finishing :

The figure when it comes out of the mould has a bright lustre. The wax rods that have now turned into metal rods

are cut and removed. The different ornaments and other details are worked out with the Goldsmith's tools.

Pickling and colouring :

A metal figure when removed from the mould has to pass through a series of acid washing in order to remove its lustre and to give it an old bronze appearance. For this the figure is first heated with a hand blower. Then it is allowed to cool. It is then immersed in a sulphuric acid bath in the case of copper and in nitric acid in the case of brass. The proportion of sulphuric acid plus water is as follows :—

Three ounces of sulphuric acid in two gallons of water. The figure is removed from the bath after an hour and is cleaned with a wire brush, tamarind and soap-nut powder.

One drop of copper sulphate is added to ten drops of water and about half the weight of borax is added to it for the preparation of the paitning medium.,This solution is slowly applied over the figure. This reduces the lustre of the figure and gives it a dark colour. Coconut oil is then applied over the figure to give it a shining appearance.

Method used for ascertaining the amount of metal required for a figure :

The wax figure is weighed after it is finished. If the figure is to be cast in brass, ten times the weight in wax is required. If it is to be in copper, also ten times. In the case of silver, twelve times and in gold, sixteen times. Panchaloha is usually used in the South. It is an amalgam of copper, brass and white lead, with a small percentage of silver and gold. In recent times an alloy consisting of ten parts of copper, half part of each of brass and white lead are used. The amount of metal required is determined according to the specific gravity of the metal or metals used.

Method for making replicas in wax :

Late Sri Asit Kumar Haldar (Ex-Principal, Lucknow School of Arts) when he was the director of the All India Handi-

crafts board at Bangalore found out a way to prepare wax replicas from the original metal figures. This method has helped this art very much. A number of copies of a single figure can be casted without any difficulty. The method is as follows :—

A piece mould of the figure is prepared in two halves. All the pieces are given three or four coatings of shellac to allow it to enter the pores, in the plaster. A Wax medium comprising of Bee wax plus paraffin wax (half part) and black colour are heated together and poured into the plaster mould. The wax is allowed to settle for some time and along with the mould is put into a vessel containing water. This helps in the strengthening of the wax. After some time the mould is opened and the figure is removed. At least five to six copies of the same figure can be prepared in a day. The copies then undergo some retouching and is ready for moulding.

Banaras Method

[This is the result of the work that is being carried on by the writer in the Fine Arts Section of the College of Music and Fine Arts with the assistance of a local craftsman.]

In Banaras we have some traditional workers in this art. Unfortunately their standard of workmanship is poor. Some of them have retained the craft aspect of preparing wax and the method of casting. They prepare replicas of bronzes for the antique seller to make a living. They employ all sorts of tricks to create an old effect to their wares. Dr. Coomaraswamy in his book on Singhalese Art has criticised the art of metal figure casting in Banaras as the worst and the best patronised.[1]

Materials used :

The main ingredients employed are Bee wax, Ambar or Ral (Hindi) mustard oil for modelling. Red clay, yellow clay (these two varieties of clay are found in a village named Sundar-

[1]Medieval Sinhalese Art. Metal casting. by Coomaraswany A. K.

pur a suburb of the city) Cotton and rice husk. These are moulding mediums. Brass and copper are generally used for casting. Very rarely gold and silver figures are cast. Some of the workmen claim that they can cast Ganga, Yamuna (in this the figure will be brass and the ornaments that of copper) figures also. They say that they know the technique of casting figures in Astadhatu (in an amalgam of eight metals).

Preparation of Wax medium :

Bee wax is heated on a slow fire. When the wax starts melting amber or ral is added bit by bit as otherwise it is likely to catch fire. When it gets thoroughly mixed up with wax, mustard oil is added to the mixure. When the three ingredients have thoroughly mixed, it is removed from the fire and allowed to cool. This mixture gets quite hard and breakes.

Method of modelling :

The Banaras craftsman prepares his figure part by part and then assembles them. His modelling begins quite hard compared to the wax used by the craftsman of Bangalore helps for a more detailed finishing. A charcoal oven is used in order to heat the figure and the tools during the process of modelling. The Banaras worker gives a fine finish to each part including the ornaments. Due to the method of preparing the figure part by part, the figures usually get disproportioned at the time of assembling. Besides they do not get the required rythm and vitality. Very seldom the worker is able to perceive it, nor does he care to do so, as his work finds an easy market. When the figure is complete cylindrical tubes of wax are inserted at suitable places for making passages in the mould for the molten metal to reach delicate parts at the time of casting. No rods or vents are inserted at suitable points for the gases to escape and for removing the hot air to prevent air-pockets that cause air bubbles.

Moulding process :

Moulding is done piece by piece. Yellow clay is employed for the first coating. The yellow clay is soaked thoroughly

and cotton is added to it as a type of asbestos. Both together are beaten with a wooden mallet till they get thoroughly mixed. Enough mixture is prepared in a lot that is required for the whole figure. Small pieces of mould are put in the deep points, where there is likely to be a catch. When all the smaller pieces have been inserted bigger pieces are formed over them. Usually the mould is finished in two halves. This is left to dry in the sun. When the yellow clay mould is dry it is given a coating of red clay mixture. The red clay mixture is prepared as follows: "The red clay is soaked and then rice husk is added to it in order to give porosity to the mould. Both are thoroughly mixed. This mixture is applied all over the yellow clay mould. When the first coat of red clay is dry, iron bands or wires are bound round the figure for reinforcement. After that a second coat of red clay is applied as a mantle. The raiser and pourer are also inserted and shaped".

Method of casting:

Pit furnace is usually used for melting the metal. The mould is heated with cowdung cakes. Hard coke is generally used for melting the metal. The mould with the wax figure inside is first heated and the wax is removed and collected in a vessel containing water. When the wax has been thoroughly removed the mould is further heated till the inside becomes red and glowing. This is the sign that the mould is ready for pouring. In the meantime metal is prepared in a crucible. More than the necessary quantity of metal is melted. When the metal turns liquid borax is added to it to remove waste matters. The mould that is ready is slowly lifted and placed over a heap of sand. The moulten metal is carefully lifted and poured inside the mould through the passage made for it. When the metal starts coming out through the raiser pouring is stopped. The mould is left to cool. After it is completely cooled it is broken open. In the case of small figures after removing the wax from the mould it is inverted and kept over the crucible in which the required quantity of metal is already placed and is fused together with a bond of clay. In this case there is no

need for a raiser. A small opening is left on the point between the mould and the crucible in order to view the metal when it is ready. When the metal is ready this hole is plugged. The mould and crucible together are inverted. The molten metal enters the mould and the casting is done.

Chasing and finishing :

First the various supports are filed out or sawed out. Then with various fine files and other tools finishing is done. Though the figure is given a fine finish in the wax state it requires refinishing in the metal. Hence the time that is spent in finishing the wax figure sometimes looks a waste.

The work of finishing the figure is not generally done by the same worker who models the figure and casts it. A commu nity called Kaseras are experts in finishing.

Painting and colouring :

Very dilute nitric acid bath is used for cleaning the figure. After the figure is thoroughly cleaned the figure is subjected to a sulphuric acid fume. This changes its colour. This work is not done by the worker who prepares the wax figure and casts it. It is done by some Mohamedan workmen who are experts in this trade.

Method used for ascertaining the amount of metal required for a figure :

The wax figure is weighed. The proportion of the metal required is determined according to the specific gravity of the metal. The proportion is as follows :—

(1) Brass ten times of the weight of the wax
(2) Copper ten times of the weight of the wax
(3) Silver twelve times of the weight of the wax
(4) Gold twenty times of the weight of the wax

The amount quoted is always a little more than the actual amount required. In the case of an amalgam of various metals the specific gravity of each metal is taken into consideration.

Method used for making replicas :

A piece mould is prepared in two halves in yellow clay. The different pieces are removed and set in their proper places and finished. When both halves are ready they are joined together and a coating of red clay is applied. If required re-enforcements are given. After a final coating red clay is given. When the mould is dry the casting is done as usual.

Conclusion :

A comparative study of the methods and the latest method of investment casting used for precision casting can help to improve the method of casting. The method of moulding used by the South Indian craftsman is better than that of the piece mould system of the Banaras worker. The piece mould method is defective in the case of small figures as the different joints do not fuse together properly and leaves webs in the joints. Both the craftsmen attempt only solid figures. Hence their figures are very heavy. From the religious point only solid figures should be used for worshipping. The method of hollow casting practised in Nepal needs to be studied and adopted. Besides attempt should be made to learn the techniques used in other countries especially in Italy. The latest ceramic shell method needs study to improve the method of moulding and casting. It is said that the Old Chola and Pallava bronzes and the Chinese Bronzes were never reworked after they were removed from the mould. At the present day the image casted is rough involving much chiselling work that the result is almost carved-out image rather than a cast one.

It has to be said with regret that our traditional craftsmen have an inherent feeling that what they know is far superior. They seldom let out their secrets and with great difficulty adopt a new technique. Our traditional craftsmen have retained the ancient techniques of their craft but they are incapable of new creations. As they inherit their vocation from their elders. They seldom try out new methods. Besides their ideas of drawing, and there dimensional views are very poor. Hence a

figure looks very good when viewed from the front but the side and three fourth views are generally bad. They seldom take inspiration from life around them for new creations. Hence their art is stagnant. It is, therefore, necessary to train young students of Sculpture who are well versed in drawing and modelling to learn the technique of wax modelling in order to create original pieces.

COLLEGE REPORTS FOR 1964

संस्कृत महाविद्यालय

संस्कृत महाविद्यालय के अन्तर्गत धर्म-विज्ञान शाखा तथा प्राच्य-विद्या शाखा नामक दो प्रमुख शाखाओं के अन्तर्गत अध्ययन-अध्यापन का कार्य सुचारु रूप से चल रहा है ।

धर्म-विज्ञान शाखा द्वारा ऋग्वेद, शुक्ल यजुर्वेद, कृष्ण यजुर्वेद, सामवेद, पौरोहित्य और कर्मकाण्ड का अध्यापन होता है । छात्रों को यह सुविधा दी गई है कि वे अपने-अपने शास्त्रों के अध्ययन के साथ-साथ कर्मकाण्ड एवं पौरोहित्य के अध्ययन एवं परीक्षण का भी लाभ उठा सकें । इसी शाखा के अन्तर्गत धर्मशास्त्र एवं मीमांसा का भी अध्यापन होता है । आर्ट्स, विज्ञान तथा महिला महाविद्यालय के छात्र एवं छात्राओं को धर्म की शिक्षा देना भी इसी शाखा का एक अंग है ।

प्राच्य-विद्या शाखा के द्वारा वेदान्त, न्याय, वैशेषिक, सांख्य, योग, पुराण, इतिहास, जैन-दर्शन, बौद्ध-दर्शन, व्याकरण, साहित्य, ज्योतिष (गणित एवं फलित), हिन्दी तथा अंग्रेजी का अध्यापन होता ह ।

महाविद्यालय का अपना विशाल भवन है, परन्तु चिकित्सा महाविद्यालय में स्थान की कमी के कारण कुछ समय के लिए इस महाविद्यालय के भवन का ऊपरी भाग उसको दे दिया गया है ।

इस सत्र में जो नवीन नियुक्तियाँ और पदोन्नतियाँ की गई हैं उनका विवरण निम्नलिखित है :

१—श्री वी० एस० रामचन्द्र शास्त्री	—अध्यक्ष
२—श्री मूलशंकर शास्त्री	—प्राध्यापक, वेदान्त
३—श्री गणेश झा	—प्राध्यापक, वेदान्त
४—श्री शिवदत्त शर्मा	—प्राध्यापक, साहित्य
५—श्री ए० सुब्रह्मण्यम शास्त्री	—रीडर, मीमांसा

वेद और साहित्य के शोध कार्य सुचारु रूप से चल रहे हैं । सामतंत्र का प्रथम भाग तथा विक्रमांकदेव चरित का प्रथम भाग प्रकाशित हो चुका है ।

शोध कार्य के लिए छात्रवृत्तियाँ निम्नलिखित प्रकार से दी गई हैं :—

१—सरकार की ओर से १००) रु० मासिक की एक पोस्टग्रैजुएट शोध छात्रवृत्ति मीमांसा के एक छात्र को दी गई है ।

२—केन्द्रीय सरकार द्वारा १०५) रु० मासिक की एक अन्ध-वधिर छात्रवृत्ति व्याकरण के एक अन्ध छात्र को दी गई है ।

३—पाँच-पाँच सौ रुपए वार्षिक की दो तथा चार चार सौ रुपए वार्षिक की दो काशिराज शोध-छात्र वृत्तियाँ चक्रवर्ती कक्षा के छात्रों को दी गई हैं ।

महाविद्यालय के निम्नलिखित विद्वानों की साहित्यिक रचनाएँ प्रकाशित हुई हैं :—

१—पं० सीताराम शास्त्री
२—पं० रामप्रसाद त्रिपाठी
३—पं० रुद्रधर झा
४—पं० गजानन शास्त्री
५—पं० दरबारीलाल कोठिया
६—पं० मूलशंकर शास्त्री
७—पं० मधुसूदन शास्त्री
८—पं० अम्बिकादत्त उपाध्याय
९—पं० रतिनाथ झा
१०—पं० रामनाथ दीक्षित
११—पं० केदारदत्त जोशी
१२—पं० विश्वनाथ शास्त्री
१३—पं० गोपालचन्द्र मिश्र
१४—पं० हीरावल्लभ जोशी

इस वर्ष यहाँ का वार्षिकोत्सव बड़े समारोह के साथ मनाया गया। कुलपति श्री एन्० एच्० भगवती महोदय ने सभापति के आसन को सुशोभित किया था। कुलपति महोदय ने महाविद्यालय के कार्य की प्रशंसा की। म० म० पं० गिरिधर शर्मा चतुर्वेदी, म० म० पं० मथुरानाथ दीक्षित, पं० टी० वी० आर० दीक्षित, पं० भागवत प्रसाद मिश्र प्रभृति विद्वानों के आगमन से उत्सव की शोभा बढ़ गई थी। रात्रि के समय काव्य-माधुरी का आयोजन किया गया था।

महाविद्यालय के भूतपूर्व अध्यक्षों तथा अध्यापकों के चित्रों का उद्घाटन कुलपति महोदय ने किया। वे सब चित्र अब विद्यालय भवन को सुशोभित कर रहे हैं।

यहाँ छात्रों के सदाचार और स्वास्थ्य का बहुत ध्यान रक्खा जाता है। छात्रों का स्वास्थ्य बहुत अच्छा है, वे शारीरिक व्यायाम में बहुत मनोयोग देते हैं। खेल-कूद में भी पर्याप्त भाग लेते हैं। छात्रों के निवास के लिए छात्रावास में समुचित प्रबन्ध है और उसके लिए उनको कोई फीस नहीं देनी पड़ती। शिक्षा भी निःशुक्ल दी जाती है। अधिकतर छात्रों को कोई न कोई छात्रवृत्ति मिलती है, जिससे वे निश्चिन्त होकर विद्याध्ययन कर सकते हैं।

यहाँ के पठन-पाठन की व्यवस्था की प्रशंसा सुनकर दूर दूर के छात्र यहाँ विद्याध्ययन करने आते हैं। भिन्न-भिन्न राज्यों से आए हुए छात्रों की संख्या नीचे दी गई है :—

भारतीय राज्य	
जम्बू	—१
आसाम	—३
विहार	—८७
पंजाब	—४
मध्यप्रदेश	—२२
उत्तरप्रदेश	—११२
उड़ीसा	—१
केरल	—१
मैसूर	—११
राजस्थान	—४
गुजरात	—५
उत्कल	—२
	२५३

विदेश	
नेपाल	—२५
पूर्वी बंगाल	—१
	२६

विद्यालय में अध्यापन का सारा कार्य संस्कृत भाषा में पुरानी शैली के अनुसार ही होता है। परीक्षा में प्रश्न-पत्र संस्कृत भाषा में आते हैं। संस्कृत के अध्यापन का माध्यम संस्कृत, हिन्दी के अध्यापन का माध्यम हिन्दी तथा अंग्रेजी के अध्यापन का माध्यम अंग्रेजी है।

संस्कृत में भाषण देने तथा शास्त्रार्थ करने का प्रोत्साहन छात्रों को दिया जाता है। समय समय पर विद्यालय में संस्कृत-गोष्ठियों का आयोजन किया जाता है, जिनसे छात्रों के ज्ञान की वृद्धि होती है।

इस वर्ष यहाँ का परीक्षा-फल निम्न प्रकार था—

परीक्षा	वर्ष	सम्मिलित छात्रों की संख्या	उत्तीर्ण छात्रों की संख्या
मध्यमा	प्रथम वर्ष	२३	२३
	द्वितीय वर्ष	१२	१०
	तृतीय वर्ष	१७	१
पौरोहित्य रत्न	प्रथम वर्ष	५	१
	द्वितीय वर्ष	२	१
	तृतीय वर्ष	५	५
शास्त्री	प्रथम वर्ष	३१	२६
	द्वितीय वर्ष	१५	१३
	तृतीय लर्ष	२१	१६
कर्मकाण्ड शास्त्री	प्रथम वर्ष	१	१
	द्वितीय वर्ष	१	१
आचार्य	प्रथम वर्ष	११	९
	द्वितीय वर्ष	१६	१३
	तृतीय वर्ष	१४	९
सम्पूर्णाचार्य		२	१

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CENTRAL HINDU COLLEGE

The Central Hindu College, established by Dr. Annie Besant in 1898, was transferred to the Banaras Hindu University Trust and became the nucleus of the Banaras Hindu University at the present site. Since then the College expanded and today it has its own postgraduate block attached to the main building. There are 15 departments in the College including 11 post-graduate departments. The strength of the teaching staff is 161 and the number of students on the roll is 1664.

It is not long ago that the Central Hindu College had the largest number of students on its rolls, of all the constitutent units of the Banaras Hindu University. The recent years, however, have registered a trend towards gradual decline. The facilities of cheap education upto the B.A. standard that almost every district town offers now through one or two degree colleges is obviously one of the factors responsible for this situation. Honestly speaking, we are happy about it. Our resources in terms of accommodation, furniture and the teaching staff have been always limited and the inordinately heavy pressure of numbers gave rise to ticklish administrative problems. Besides, it had an adverse impact on the academic standards. We have at present 918 and 499 students in under-graduate and postgraduate classes respectively. The total number of research students in different subjects is 60. With the completion of the postgraduate building the problem of accommodation has been partially solved.

For good academic standards there must be a reasonable measure of correspondence between the numerical strength of the teachers and the students. Conditions in this regard have no doubt improved ; but the strength of each department needs being further augmented in the interests of better academic efficiency. In compulsory subjects like English and Hindi we are not able to organise tutorial work on an efficient basis. (Because of less number of teachers than are needed) Due to lack of hands there are as many as 70 to 80 students in a tutorial group. Though the conditions in other departments are not so bad, they can hardly be described as fully satisfactory.

A University is not just a place where teachers communicate ready-made knowledge to a body of students. It justifies its existence really by extending the frontiers of knowledge through research. A noticeable feature of the recent trends with regard to the numerical strength in undergraduate, postgraduate and research sections is the steady rise in the number of research students year after year. It is a matter of gratification that our teachers and research students consider research to be a vital part of their academic life.

With a view to encouraging the spirit of research and initiating postgraduate students with requisite talents and aptitude into its technique, each department organises seminar programmes. The department of English with a University Grants Commission grant undertook last year the publication of a volume of research papers contributed by a number of teachers. We hope that the facility of bringing out research bulletins will be extended to other departments as well and departmental publications will become an annual feature of our academic life.

In the interest of better research activity the need of a well-equipped seminar library in each department can hardly be over-emphasized. A few departments like Commerce and Mathematics do have some kind of a seminar library. The department of English has made a start this year with a munificent donation of about a thousand books from Dr. U. C. Nag who was associated with this college as Head of the Department of English and also as Principal for a number of years. We expect the University Grants Commission also to help us generously in building up seminar libraries in different departments.

Research now a days even in humanities is an expensive affair and we have to see that our young students with talents are not handicapped for financial reasons. The total number of research scholarships from the University Grants Commission and other agencies must be increased considerably.

It is also very necessary for the University to undertake the publication of research theses and other books by teachers which are the fruits of years of hard labour. Private publishers who go by commercial considerations may not be inclined to venture into their publication. It is in our interests if the academic world here in India and abroad is made acquainted with work being done by our scholars.

It is a matter of pride and honour for us that many of our teachers were invited to participate in learned conferences here in India and outside. Dr. T. R. V. Murti, Professor and Head of the Department of Philosophy, was elected the General

President of the Chandigarh session of the Indian philosophical congress. He was also invited to participate in the East-West Philosophical conference at Hawaii. Dr. R. N. Bhargava, Professor and Head of the Department of Economics, was at Colorado University, U.S.A. for about a year as a visiting professor. Pandit Vidyabhushan Misra of the Department of Hindi went to Maxico for teaching Hindi and came back recently. Dr. H. L. Singh, Professor and Head of the Department of History, was invited to New Delhi by the University Grants Commission to participate in a seminar on postgraduate teaching and research. Dr. A. P. O'Brien, Professor and Head of the Department of English, was elected general Secretary of the All India English Teacher's Conference at Jaipur. Dr. K. V. Rao, Professor and Head of the Department of Political Sciences attended Seminars at Simla, Bombay and Delhi.

We had during the last session a number of distinguished visitors, Indian as well as foreign, who gave us the benefit of their scholarship in different branches of knowledge. Shri Sri Prakasa and Shri R. R. Diwakar visited the Department of Political science. The Department of Philosophy had lectures by two American Professors, Dr. Karl. H. Potter and Prof. Cantwell Smith. Dr. (Mrs.) Anna T. Burrell of the U.S.A. and Miss S. M. Hoch of the W. H. O. came to the department of Psychology. The department of Economics was visited by Prof. D. M. Alexandrovich of the U.S.S.R. while Mrs. Chapman, the visiting Professor of Economics in the University of Bombay, lectured under the auspices of the Commerce Department. Some other eminent visitors were Dr. A. Kawaguchi of Japan to the Department of Mathematics ; Dr. Ishwari Prasad and Dr. Raghubir Singh to the Department of History ; Shri Agyeya, Pandit Laksmi Narayan Mishra and Dr. Jayadeo Singh to the Department of Hindi.

We had a number of new appointments last year in various departments. Dr. Hiralal Singh joined as Professor and Head of the the Department of History. The following persons were appointed Readers :

Dr. V. S. Mall in the Deparment of Hindi.

Dr. M. C. Joshi in the Department of Psychology.

Shri A. K. Shah and Shri H. S. Kulshrestha in the Department of Commerce.

Shri Lallanji Gopal in the Department of History.

Dr. (Misr.) B. K. Paintal in the Department of English.

New Lecturers on the college staff are:

Shri V. K. Kool and Shri D. M. Pestonji in the Department of Psychology.

Dr. Tribhuwan Singh and Dr. N. N. Upadhyaya in the Department of Hindi.

Shri K. L. Kool in the Department of Economics.

Dr. G. S. Nepali and Mrs. S. Jetley in the Department of Sociology.

Dr. H. N. Tripathi and Dr. T. N. Pant in the Department of Political Science.

Shri S. N. Upadhyaya in German.

Shri H. C. Nayyer of the Department of Arabic and Persian went to the U.S.A., and Shri K. S. Misra of the Department of English went to the Central Institute of English, Hyderabad, for winning higher academic distinctions. Dr. K. Sivaraman of the Department of Philosophy has gone to the Harvard University for higher studies.

We are sorry to report that some of our distinguished teachers left the University for taking up work elsewhere. Pandit Vishwanath Prasad Misra of the Department of Hindi went to Magadh University, Gaya, as Professor and Head of the Department of Hindi, Pandit Karuna Pati Tripathi of the same department has joined the Sanskrit University as Professor and Head of the Department of Education. Shri S. N. Rath of the Department of Political Science went to Utkal University as a Reader.

The Department of Statistics suffered a grievous loss in the sad death of Shri K. N. Singh in the U.S.A. He was a

youngman of great promise and had gone to America for higher studies. Another sad event towards the close of the last session was the death of Prof. K. L. Verma, who had retired as Professor and Head of the Department of Political Science only about two years back. He had been distinguished teacher and had a number of scholarly publications to his credit.

The Central Hindu College had had a glorious past and with a propitious academic climate it should certainly live upto the ideals which inspired its founders. It will be our constant endeavour to further healthy academic causes so that our country which suffered intellectual decline as a consequence of centuries of slavery once again comes into its own.

COLLEGE OF SCIENCE

The total strength of the College at the beginning of 1964-65 session was 1765 as per following details :—

Class	*Total strength*
P.U.C. (Sc.)	351
B.Sc. Part I	268
B.Sc. Part II	333
B.Sc. Part III	229
M.Sc. Previous	233
M.Sc. Final	145
Ph.D. & other students	236
Total ...	1765

At the 1964 Examinations of the University 195 students passed P.U.C. (Sc.) Examination, 159 students passed B.Sc. (Three Year Degree Course) Examination, 135 students passed M.Sc. Examination. 23 Research students were awarded Ph.D. Degree at the last Convocation of the University held on 25th December, 1964. The Examination results were very satisfactory. A number of our students won medals and prizes

for their meritorious performance at the last examinations of the University.

1. The Chancellor's Medal was awarded to Shri Surya Narayan Thakur for securing the highest percentage of marks at the M.A. & M.Sc. Examination of 1964.
2. Dr. Basudeo Sahani Medal to Shri Bishwanath Bhattacharya for standing First at the B.Sc. Pt. III Examination of 1964.
3. Dr. S. C. De Medal to Shri Dudh Nath Singh for standing First in Mathematics at the M.A. & M.Sc. Examination of 1964.
4. The Nand Lal Medal to Shri Bhai Ram Yadava for standing First at the B.Sc. Pt. III Examination of 1964.
5. R. B. Munshi Shiva Pd. Medal to Shri Preet Pal Singh Saluja for standing First in Mathematics at the B.A. & B.Sc. Pt. III Examination of 1964.
6. Smt. Gargi Devi Deodhar Medal to Shri Bishwanath Bhattacharya for standing First among B.A. & B.Sc. Part III Examination of 1964.

Some Important Events of the year are :—

1. One of our old students, Dr. Jayant Vishnu Narlikar who had a very brilliant career in our college and who has been working at the Cambridge University in various capacities has made outstanding contributions in the field of Science.

2. Dr. A. R. Verma went to Europe for 2 months and visited several laboratries.

3. Dr. B. Dayal who received the Watumull Prize last year, has been made additional Professor of Physics.

4. Prof. G. B. Singh participated in the 'International Symposium on the Chemistry of Natural Products' at Kyto, Japan as an official National Delegate.

5. Summer Institute in Biology for College teachers of the Eastern Zone under Dr. Ram Deo Misra and Dr. S. P.

Ray Chaudhuri as Director and Joint Director respectively, and a Summer School of Physics for College and Secondary School teachers of the Northern Zone under Dr. A. R. Verma were organised in our College.

6. A Physics Symposium sponsored by C.S.I.R. was arranged in the Deptt. of Spectroscopy by Dr. N. L. Singh.

7. Prof. S. P. Ray Chaudhuri visited the Genetics laboratories of Leningard and Moscow as a Member of the Cultural Exchange Programme of the U.G.C.

8. Dr. J. P. Thapliyal, participated in the International Symposium on comparative Endocrinology held at Paris from July 20 to 25, 1964.

9. Dr. M. S. Kanungo participated in the Symposium on Experimental Gerntology held at Bassel, Switzerland from Oct. 23 to 25, 1964.

10. Dr. Rajnath was one of the member of the Organising Committee for the International Geological Congress held at Delhi in Dec. 1964.

11. Prof. R. L. Singh was invited El Colegio De Mexico for a course of lectures on Geography of Asia. He took this opportunity for going round the world and visited Japan, Hawaii, U.S.A., England and Moscow besides staying in Mexico for 5 months. Prof. Singh also represented India in the International Geographical Congress held in London last August.

12. A fairly large number of member of the teaching staff from different Deptt. have participated in various symposia, meetings etc. held in India in their respective subjects.

13. Dr. A. R. Verma is serving on the Editorial Board of Solid State Communications', a Journal of international importance.

14. The Journal 'Tropical Ecology' published by the International Society for Tropical Ecology is continued to be edited and managed by the staff of the Deptt. of Botany.

15. Dr. N. L. Singh along with his band of workers has been rendering a very valuable service to Hindi as Director of

the Hindi Cell and Manuscripts of a fairly large number of Scientific books are awaiting publication.

16. From a grant of National Bureau of Standards, the Deptt. of Physics has procured an Electron Microscope.

17. One unit of the Phytotron, the first of its kind in India, is under assemblaze in the Deptt. of Botany.

18. Prof. Bragg and a fairly large number of other scientists from abroad as well as from the different Universities of India delivered lectures in different Departments of the College.

19. Out of those who did research work in the Laboratories of the Science Departments, 23 persons were awarded Ph.D. degree of our University in the last convocation.

Scholarships :

The College is getting over 4½ lakhs of Rupees out of which 451, Research, M.Sc. & B.Sc. students are getting scholarships. The figures of holders of the Statewise Scholarships and of other sources are given below :—

	No.	*Amount*
Central Govt. including R.T.S. & C.S.I.R.	160	Rs. 2,47,400
U.G.C.	26	30,540
State Govt.	86	24,865
B.H.U.	35	14,940
Other Sources	144	1,28,222
Total ...	451	Rs. 4,55,967

TEACHERS' TRAINING COLLEGE,

The College session began on 9th July, 1964. Admissions to B.Ed. and M.Ed. almost were completed by the middle of July. Total number of admissions to B.Ed. were 111 and to M.Ed. 12.

Pt. Lalji Ram Shukla retired on 8th July, 1964, and was succeeded by Sri Surya Nath Singh, who was already working as a temporary lecturer. Km. Sudha Srivastava who topped the list of successful candidates in first class in M.Ed. examination of 1964. succeeded Sri Surya Nath Singh as a temporary lecturer. Km. Kala Kaul continues as a temporary lecturer as before. In October the staff was enriched by the addition of Sri S. N. Chatterjee, Ex-Head of Department of Education, Harish Chandra, Degree College, Varanasi. But we missed Sri P. V. Choudhuri who left us to join as Principal, Govt. Senior Basic Training College, Banipur, W.B.

Miss S. Varsheny continues her research work in U.S.A.

Prof. E. J. King, Reader in Comparative Education, University of London, gave a series of lectures on Comparative Education from 14th August to 26th August.

Dr. Mrs. Indira Rothermund addrressed the staff and students of the College on 27-11-64. She spoke on Comparative Education.

Dr. J. Paul Leonard, Prof. of Education in Columbia University, consultant on Education to the Government of India, and Chief of Party of Columbia University Teachers' Team in India, visited the College and lectured for three days from 9th to 11th December, 1964, on "Problems of Arts Colleges in India—some proposals" and on "Improvement of Programmes in India for the training of Secondary School teachers."

Sri Ramapati Shukla, attended a workshop on Evolving an Evaluative Criteria for the supervision of Secondary Schools, sponsored by DEPSE, in Delhi, from November 24 to 26, 1964. He was also invited to direct the Workshop of Hindi Lecturers of Training Colleges in Gujerat, sponsored by the Hindi Shikshak Mahavidyalaya, Gujerat Vidyapeeth, Ahmedabad, from 26th to 31st December, 1964.

Sri O. P. C. Gupta, attended a Workshop on Experimental Projects sponsored by DEPSE, in Shantiniketan, Bengal, from 30th December, 1964, to 4th January, 1965.

Literary activities organised by the pupil-teachers of the College included a Kavigoshthi (Poetry Recitation) on 15th August, 1964, in which two local poets of Hindi besides our own students participated. There was also a debating competition on 7th October, 1964. A cultural programme was successfully organised by the students on 9th October, 1964. A symposium on Jawahar Lal Nehru was another activity organised by the students on 14th November, 1964.

Km. Rosie Johnson and Sri Shyamadas Shah of B.Ed. participated in the C. N. Hangal Memorial Teaching competition held in the Govt. Basic Training College, Varanasi. Kumari Johnson was awarded First Prize.

The Extension Services Department of the College, of which Dr. Razdan is the Hony. Director and Sri G. N. Nagar is the Co-ordinator, organised a number of activities from March, 1964, to February, 1965. They are listed below briefly :

1. From 3rd March to 10th March, 1964. Workshop on the Standardization of Hindi Curriculum for classes VI to VIII under the auspices of the Department of Curriculum, Methods and Textbooks (N.C.E.R.T. Delhi). Resource Personnel Pt. Ramapati Shukla, Sri Anil Vidyalankar of the Department was the organiser, Sri B. Ghosh, Director and Sri T. S. Mehta, Field Adviser also participated.

2. From 20th March to 22nd March, 1964. Seminar on Science, organised by the Department of Science, N.C.E.R.T. Delhi, under the direction of Dr. V. N. Wanchoo of the Department. Sri O. P. C. Gupta of our College also participated.

3. Under the Scheme of Intensive School Improvement Higher Secondary School Principals' meetings were held from 20th to 27th June, 1964, 11th to 12th October, 1964, 11th to 12th November, and 18th November, 1964, on 11th and 12th December, 1964, and 13th February, 1965.

4. A Seminar on the Teaching of Hindi Poetry was held under the Directtion of Pt. Ramapati Shukla from 3rd February to 5th February, 1965.

5. A Seminar on Evaluation in Mathematics was held from 10th to 12th February, 1965, directed by Sri R. C. Gupta.

Results of B.Ed. Examination, 1964 :

Appeared : 126

Passed in Theory : 126 ; in Practice : 125

I classes one in Theory and 8 in Practice

M.Ed. Examination, 1964 :

Appeared : 12

Passed : 100%

4 passed in I class.

WOMEN'S COLLEGE.

During the last thirty five years the college has had a steady growth and has expanded in all spheres. This year has been a fruitful one with a good all round record.

Our strength has gone up this year and we have on our rolls 534 students coming from the different states of India. The number of students on the Arts side is 360 while 174 have opted for science. The no. of day students is 369 and that of hostel students is 165.

Results.

The achievements of our students at the various University examinations have been very creditable. The total percentage of passes at the various University examinations is as follows :—

P.U.C. Arts.	78.5%
P.U.C. Sc.	74.5%
B.A. Pt. I.	72%
B.A. Pt. II.	87.5%
B.A. Pt. III.	97.1%
B.Sc. Pt. I.	66.6%
B.Sc. Pt. II.	65.7%
B.Sc. Pt. III.	Cent per cent.

Our students have won many academic distinctions and top honours at the B.A. B.Sc. examinations of 1964. Km. Krishna Banerjee has topped the list at the B.A., B.Com. examination of 1964 with four medals and three prizes to her credit. The first two ranks in B.A. Part II, Pt. I and P.U.C. Arts have also been obtained by our students. The names of the rank holders in the order of merit are Mita Roy Choudhury and Sarbani Mazumdar in B.A. Pt. II. Lata Kumari Beri and Badrun Nisa in B.A. Pt. I Kusum Chakravarty and Sudakshina Agrawal in P.U.C. Arts.

The medals and prizes for standing first in many subjects have also been annexed by our students. The Prize winners are : Krishna Banerjee (in Bengali, Philosophy, and Sanskrit) Kumud Prabha Srivastava for Psychology & Hindi, Urvi Kaul for English, Krishna Chatterjee for Music, Urmila Tiwari for Chemistry & Botany and Ira Bhaduri for Home Science, Geography and Zoology. This is for the third time consecutively that our College has secured the first rank in Geography.

Scholarships.

The students enjoy the benefit of a number of scholarships awarded by the University, besides the state and Central Govt. Scholarships. At present 32 students have got the University scholarships, three the Govt. of India scholarships (for backward classes) and one Assam Govt. Scholarship. In addition there are three National Scholarships for Rs. 75/- per mensom sponsored by the Govt. of India. Apart from these there are merit scholarships—Seven awarded by the University and four by the U.P. Government. The University has granted full freeship to 125 students.

The Staff

We have had a few changes among our staff and temporary appointments have been made to fill the leave vacancies. The following have been appointed as temporary lecturers or as Instructor :—

(1) Mrs. Ahalya Chintamani, in Botany.
(2) Mrs. Kamala Srivástava, in Sanskrit.
(3) Miss. Meenakshi Devi, in Physics.
(4) Miss. Deepa Thapan, in Geography.
(5) Miss. Anakshi Sexana, in Chemistry.
(6) Miss. G. Lalita, in Zoology.
(7) Miss. Usha Kaul, in English.
(8) Miss. Jayalakshmi, Instructor in P.T.

Besides six permanent appointments have also been made. Their names are as follows :—

(1) Mr. T. N. Nagar, in Instrumental Music.
(2) Mrs. B. Seetal, in Vocal Music.
(3) Mrs. Chandra Kala Singh, in Psychology.
(4) Mrs. P. Rajeswari, in Chemistry.
(5) Miss. Rajlakshmi, in Home Science as Instructor.
(6) Mr. Makarand Rai, as Tabla Accompanist.

We welcome on our staff, Dr. (Mrs.) Krishna Tiwari Lecturer in Mathematics who has joined the College after a profitable study in Canada.

We are glad to have an our staff under the Full Bright Scheme, two young American lady tutors—Miss. Nancy Silverman and Miss. Michaelym Breton.

Miss. Hiran Malani has been deputed again this year by the University for completing the course of studies in the Institute of English at Hyderabad.

(Mrs.) Shanti Bajpai and Miss. Pushpa Kapoor have been appointed as Wardens. Dr. (Mrs.) Sobha Rani Basu—Reader in Philosophy has been transferred to the Arts College.

We are happy to mention the distinction won by Mr. V. B. Smart lecturer in Painting. He has been awarded Rs. One thousand in the National Exhibition of Art for his painting named "Bazar" (23-2-64). The Lalit Kala Academy of Uttar Pradesh also awarded him Rs. One hundred for his painting "The Buddha returning home."

Dr. (Mrs.) Kamalaveni Chandrasekhar's research scheme on 'certain aspects of fish development' submitted to the State Council of Scientific and Industrial Research has been approved and a sum of Rs. 1000/- has been granted to her.

The University has also deputed some of the members of the staff as delegates to the various conferences. Mr. B. Patakar read a paper in the all India Music teachers' conference at Jaipur on "Different opinions on Indian Music and their effects", which was much appreciated. Dr. Shukla was deputed to the Home Science Conference at Bombay, and (Mrs.) Sita Srivastava to the Political Science Conference at Chidembaram.

An additional post of lecturer in Chemistry has been sanctioned by the U.G.C. Due to the keen interest taken by our Vice-Chancellor the post of a lecturer in Dancing has also been created this year.

On the administrative side our senior clerk Mr. Das Gupta retired last April and we wish to place on record our appreciation of the good work that he did. Mr. C. B. Lal has been appointed in his place.

Athletic Association and N.C.C.

This year the tempo of activities of the Women's College Atheletic Association was unusually high and lively. The students participated in the Inter University Badminton, conducted in October at Lucknow. The National efficiency Drive organised by the University under the direction of the Inter University Sports Board for all women students was held on 22nd, 23rd and 24th November 1964. The girls evinced keen interest and out of 26 participants who took part in the various events, eleven of our students got one star each. Great enthusiasm was shown at the Annual sports also.

A separate competition for women students belonging to different constituent colleges was conducted for the first time this year under the auspices of the B.H.U. Inter College Sports Meet held on the 11th, 12th, and 13th December '64. Both the team and the individual championships were won by the

Women's College. Miss. Kusum Haksar was declared the individual champion both in the University Sports and at the annual sports meet conducted by the College Athletic Association.

The N.C.C. training camp was held during the Pooja vacation and our cadets acquitted themselves creditably.

Cultural Association.

The Cultural Association has been very active under the guidance of Dr. Mrs. Kamalaveni. Miss. Kusum Haksar is the Vice-President and Miss. Leela Rao is the Secretary besides the various class representatives. It was inaugurated by our Vice-Chancellor on the 15th of Sept. '64. We had two very interesting music programmes in Western music. A Vocal music performance by Miss. aymmie Fallet of France and a giutar performance by Mrs. Martha Betson of U.S.A.

Hindi and English debates were held. Dr. (Mrs.) Menon and (Mrs.) Vidya Gupta took keen interest in organising these debates. A music competition was organised. Two of our students Jaya Shenoy and Indira Agrawal participated in the all India Inter collegiate debate for Women students held at Patna University on the 7th of December '64. They annexed the trophy and also the first and second prizes. The student participated in the Youth Festival also.

Distinguished Visitors to the College.

Many distinguished visitors have came to the college this year. The most outstanding of them being—Her Imperial Highness Princess Achraff Pahlavi (8-1-64) & Her Serene Highness, the Princess of Thailand and her sister (2-12-64). Professors from Tokyo and American Universities also visited this college besides foreign journalists etc.

Development

In the third plan period a sum of Rs. 2 Laks and 69 thousand was sanctioned for the college for constructing the Home Science, Geography and Music blocks and also for the purchase of scienti-

fic equipments. The buildings are yet to take a concrete shape. We have also asked for 2.54 Lakhs more for a library block and hope the U.G.C. would sanction it.

We have sent in a scheme under the IV plan for 14.35 laks under the consolidated scheme for building more for laboratories, departmental rooms, class rooms, etc. Under new projects, we hope to have a Post graduate course in Home Science and we also want to introduce new subjects like Statistics & Sociology for which we require 5.65 laks.

COLLEGE OF MUSIC & FINE ARTS

1. *Examination Results—1964.*

Examinations	No. of candidates appeared	No. of candidates passed	Percentage of passes
Admission Certificate in Music (Old)	27	22	81.5%
Diploma in Music (New)	13	8	51.54%
Diploma in Music (Old)	8	7	87.5%
B.Mus. (Old)	7	6	85.7%
B.Mus. Part I (New)	1	1	100%
B.Mus. Part II (New)	2	2	100%
M.Mus. Prev.	5	5	100%
M. Mus. Final	3	3	100%
D. Mus.	2	2	100%
Diploma in Fine Arts (New)	4	3	75%
Jr. Diploma in Painting (Old)	6	5	83.3%
Jr. Diploma in Scultpure (Old)	1	1	100%
Degree in Fine Arts Pt. I (New)	4	4	100%
Degree in Fine Arts Pt. II (New)	3	3	100%

2. *Admission—1964-65 :*

	Male Students	Female Students	Total
Diploma in Music (New) :			
I-Yr.	95	26	121
II-Yr.	20	9	29
III-Yr.	6	5	11
B. Mus. Degree Course :			
Pt. I	3	2	5
Pt. II	2	2	4
Pt. III	1	1	2
M. Mus.			
Pt. I	8	3	11
Pt. II	4	1	5
D. Mus. (Prev.)	1	—	1
Diploma in Fine Arts (New)			
Pt. I	3	3	6
Pt. II	4	—	4
Pt. III	1	2	3
Degree in Fine Arts (New)			
Pt. I	2		1
Pt. II	3	3	6
Pt. III	3	—	3
Sr. Diploma in Painting (Old IV-Yr.)	1	—	1
Sr. Diploma in Sculpture (Old) IV-Yr.)	1	—	1

3. *New Addition to the Staff :*

The under mentioned staff have been appointed in our College during the session 1964-65.

Karnatak Music :

1. Shri A. Subramanyam, Lecturer in Veena,
2. Shri S. R. Kannan, Lecturer in Vocal,
3. Shri V. K. Venkatramanujam, Lecturer in Violin.

Hindusthani Music :

1. Shri Chittaranjan Jyotishi, Lecturer in Vocal Music,
2. Km. Vimala Kapoor, Instructor in Sanskrit.

4. *New Courses :*

This year we have started Three Years' Diploma Course in the Karnatak Music of our College and the arrangement for the following subjects have been made :

1. Vocal
2. Veena
3. Violin

This Section has formally been inaugurated by Justice T. L. Venkatarman Aiyer, a well-known Musician and Musicologist on 14th Sept., '64.

5. *Research Section :*

The work of editing and printing the 2nd Volume of Sangita Raja was taken in hand and out of the three parts on Instrumental Music, Dance and Rasa comprising it, the first part entitled Vadyaratnakosha has been printed. Work on the remaining two parts is in progress.

The first batch of D. Mus. students passed in 1964, securing about 70% marks in their theses.

6. *Distinguished Visitors & Extra Curricular Acitvities :*

This year Mrs. Martha M. Bateson, an American Folk Singer and Guitar Player gave her performance in our College on 10-12-64.

As usual this year also the Vishnu Digambar Jayanti was celebrated on a grand scale from 2nd Sept. to 6th Sept., '64 and six concerts were organised on this occasion and all the members of the staff and students of the College took part in the same.

Ustad Bare Gulam Ali Khan paid a visit to our College. His performance was organised in the Multi-purpose Hall on 9th December, '64 which was of great success. He gave his performance in Puria Dharashree, Kamod and a few of his

well known Thumaries which were very much enjoyed by the staff and students of the University.

This year the Anniversary celebration of St. Thyagraja was held in our College on a grand scale on 21st Jan., 65, On this occasion the following programmes were presented by the staff members of our College :—

(1) Puja,
(2) Short life Sketch of St. Thyagraraja,
(3) Sitar recital by Shri Raj Bhan Singh accompanied by Shri Nageshwar Prasad on Tabla.
(4) Vocal recital by Shri M. R. Gautam accompanied by Shri Ishwar Lal Mishra.

The Practical Demonstrations of our College students were also held in our College from 30-11-64 to 5-12-64. in which all the students of the College gave their performance.

Fine Arts Section

Session 1964-65 marked a complete change in the working hours of this Section. From this year, this Section started functioning from 11.00 A.M. to 5.00 P.M. instead of 3.00 P.M. to 8.00 P.M. during the previous years. Besides, admission was restricted to full time students only. The number of students in this section this year is 27 (16 boys and 11 girls) both in the new and the old courses. The first batch of final year degree students will be passing out this year.

A Visiting Committee in Applied Arts appointed by the All India Council of Technical Education visited this Section on 8th August, 1964. The Committee was to view the working of the Fine Arts Section and to suggest suitable improvement with regards to building space, equipment, curriculam etc. It is expected that the Committee has recommended for a full fledged College of Fine Arts.

Prof. John Davis, A Visiting Professor from America in the Faculty of Fine Arts, Baroda University, gave two lectures during the American Literary Week on 8th 9th and 10th of Nov. 64. Prof.Vasudeva Sharan Agrawal presided.

The students of the Section went on their Annual Excursion to South India under the guidence of Shri M. V. Krishnan, Lecturer in Sculpture. They visited important places well known for Fine Arts and did lot of work and photographs. They held an Exhibition of their work after their return.

Shri R. S. Dhir, Instructor in Painting received an award from All India Art Exhibition organised by the Madhya Pradesh, Kala Parishad, Gwalior.

Shri Dhir went to Baroda University to participate in the Winter School in Graphic Arts. He also held an Exhibition of his works in August, '64 which was inagugurated by Shri Jyoti Bhushan Gupta, Hony. Treasurer of the University.

Distinguished Visitors :

(1) Stella Kamarish, Prof. of Art, Pentilveniya University, U.S.A.

(2) John Devis, American visiting Professor of Art in the Baroda University.

(3) Walter Spink, Prof. of Art, The Michigon University, U.S.A.

COLLEGE OF INDOLOGY

The College of Indology was established in the year 1950. The foundation-stone was laid by Dr. Rajendra Prasad, the first President of the Indian Republic. It caters for postgraduate teaching and research. Ever since the foundation of the College it has attracted students from all parts of India and from foreign countries. The number of foreign students, in particular, has been steadily increasing. During the session 1963-64 their number was 24 ; this year it has risen to 44. It is proposed to develop this College as a centre of oriental studies in pursuance of which the departments covering the history and culture of other countries of Asia are proposed to be added in due course. There is already a provision for the teaching of nine

Asian languages, namely, Tibetan, Cambodian, Burmese, Thai, Old Javanese, Indonesian, Singhalese, Japanese and Mongolian. Besides the work of the archaeological excavation and exploration, the College has other projects, e.g. the preparation of subject-index of the Puranas, a comparative study of Buddhist Iconography from Tibetan and Nepalese sources.

I. The following Research Scholars got Ph.D. Degree on 25th Dec., 1964

A. *Department of Ancient Indian History, Culture and Archaeology :*

(1) Shri Hit Narayan Jha
(2) Shri Prashant Kumar Jayaswal
(3) Km. Dharmawati Srivastava

B. *Department of Sanskrit :*

(1) Shri Narendra Chandra Nath
(2) Shri Braj Behari Chaubey
(3) Shiva Nath Sharma Pandey

C. *Department of Indian Philosophy and Religion :*

(1) Mr. Anthony John Alston
(2) Shri Jagdish Sahai Srivastava

D. *Department of Art and Architecture :*

(1) Shri Rajatananda Das Gupta

II. Academic Activities

A. Under the auspices of the College Research Seminar the following Seminars were held :

1.	Cult of Devotion	Dr. S. Bhattacharya	20-11-64
2.	Cult of Devotion	Dr. S. Bhattacharya	4-12-64
3.	The Conception of Avacchedakatva in Navya Nayaya	Dr. D. C. Guha	15-1-65
4.	The Conception of Avacchedakatva in Navya Nayaya	Dr. D. C. Guha	25-1-66

B. In the Department of Sanskrit 7 Seminars were held in which research scholars and some teachers read research papers.

C. In the Department of Indian Philosophy and Religion 6 Seminars were held in which different research scholars read research papers. The papers were followed by comments and discussions.

D. In the Department of Ancient Indian History Culture and Archaeology a Seminar on the regional history was organised by the Department in which teachers of the Departments of History, Politics and Philosophy, participated. Dr. R. C. Majumdar, the first Principal of the College of Indology, B.H.U., presided.

III. Foreign Visitors and Distinguished Guests

Following visitors and guests delivered lectures in the College.

1. Professor R. U. Huntington
2. Dr. J. D. Roberts
3. Dr. R. C. Majumdar
4. Sri Ashok Kumar Das
5. Prof. Jack Davies
6. Dr. Moti Chandra
7. Sri K. P. Khandelwal
8. Sri E. Buser,
9. Prof. D. D. Kosambi
10. Sri B. B. Lal
11. Dr. B. P. Sinha
12. Dr. R. K. Dikshit,
13. Prof. H. J. Planderlieth,

IV. Lectures

Under the auspices of the Department of Ancient Indian History, Culture and Archaeology, Shri Bholanath Vertibrate Geologist and Shri Rakshit of Anthropological Survey were invited to deliver special lectures to the students of Archaeology on Geology and Anthropology respectively.

Prof. D. D. Kosambi delivered a series of three lectures illustrated by slides on Archaeology and field work.

Prof. R. C. Majumdar delivered his lecture on the Role of History.

The Department of Ancient Indian History, Culture and Archaeology also organised a series of 9 lectures on the history and culture of Latin America delivered by Mr. Roberto Escalante.

The Department of Ancient Indian History, Culture and Archaeology, received this year, besides a group of students from Wisconsin, two students from the School of Oriental and African Studies, University of London, who are studying in the Department as part of their courses in London.

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DEPARTMENT OF LIBRARY SCIENCE

The result of the first batch of B Lib Sc had its reaction in the qualitative increase and the quantitative decrease of the applicants for the course in view of the admission restriction.

01 Examination Result

The Bachelor's Degree Course was introduced last year even with an inadequate staff. The result of the 1964 examination was quite encouraging as can be seen from the analysis given below :

Students appeared	*Students passed*	*1st Division*	*2nd Division*	*Pass*
34	32	6	19	7

02 Admission

In the current session 42 students were admitted, of which 26 are residing in the campus.

02 Financial Assistance

At present, 14 students are recepients of financial assistance from the University. Besides this, 8 students have been recommended to the Dean of students for help from the Students Welfare Fund.

1 Library Science Association

The following office bearers were elected for Library Science Association besides Shri P. N. Kaula who is the President of the Association.

President	Shri P. N. Kaula
Vice-President	Shri B. Goswami
General Secretary	Shri M. David
Treasurer	Shri R. C. Verma
Social Secretary	Shri V. K. Tripathi
Games Secretary	Shri S. Singh
Cultural Secretary	Miss R. Banerjee
Members of the Executive	Shri S. P. Mehta
	Shri K. P. Dubey
	Shri V. P. Tripathi
	Shri J. L. Pandey
	Shri N. B. Joshi

The Association celebrated its inaugurate function on 7th October, 1964. Shri Jyoti Bhusan Gupta, Honorary Tresurer, B.H.U. was the Guest of Honour. Shri Gupta explained the important role of the library for the society. He urged the librarians to keep up the enthusiasm of service. Shri Gupta also agreed with the view expressed by Shri Kaula regarding the need for study tours and publication of an Annual from the Department and assured his support for the same.

2 Lectures

Several distinguished persons visited and observed our academic activities during the current session. Some of the eminent persons gave illuminating talks on the subject of their specialisation.

1.	Prof. S. Das Gupta Head of the Department of Lib. Sc. Delhi University.	Library Education
2.	Shri A. P. Srivastava, Head, Dept. of Lib. Sc. Rajasthan University.	1. Reading Habits in Higher Education. 2. Canon of Helpful sequence, Experiences in Librarianship
3.	Prof. Bashiruddin, Ex-Director of Libraries at Jammu & Kashmir and Rajasthan University.	
4.	Shri N. N. Gidwani, Librarian, Rajasthan University Jaipur.	Librarianship Today.
5.	Shri Mazuffar Ali, Dy Librarian, Aligarh University.	Working of the Muslim University Library, Aligarh.
6.	Shri Chakravarti, State Librarian, Bengal.	Libraries in Bengal
7.	Shri M. K. Mehrotra Librarian, American Cultural Centre, Lucknow.	Reference Service in USIS Libraries.
8.	Miss Smith Brooklin, Public Library, New York.	Experiences in Children's Libraries.

These talks had been very informative and full of latest trends in library field in some of the progressive countries of the world.

3 Seminars

As usual, the seminars have been the centres of intellectual activities and a feature of attraction for the students. The members of *BHULSA* took active part in the seminars with full vigour. A number of seminars were conducted during the session. A brief resume of the same is given below :

1. Should there be library law for proper library development in an area ?
2. Concept of corporate authorship.

3. In a well organised library, the main service required is long range reference service.
4. Facted pattern of classification can alone meet the challenge of the dynamic growth of knowledge.
5. Brown's charging system is still the most well suited issue apparatus for Indian libraries.
6. The classified approach to the arrangement of entries in a catalogue is fully in consonance with the approach of the reader.
7. For the uniform and full provision of library service in an Area, legislative pattern is the best.
8. Uniformity, economy and standardisation in the derivation of subject-headings is only possible through chain procedure.
9. The pattern and arrangement of entries in a subject bibliography should be in consonance with the latest techniques evolved in this direction.

The seminar activity started with an introductory talk over "The methodology of seminar" given by Shri Kaula. Much enthuisiasm was noticed among the students during the period of seminar activities. At times, a sharp spirit of intellectual competition was visible among the participants for pressing their points.

4 Professionals' Trips

As in the past, professionals' trips were organised to enable the students to have the first hand opportunity by observing the functioning of the libraries and the other allied activities. The first such trip was to the Sanskrit University where the students were shown the maintenance and keep up of manuscripts and organisation of microfilm and photo-duplication activities of the library. Students were also shown the lamination of manuscripts and fumigation of infected books through indeginous method. Another trip was organised to the B.H.U. Press in order to show the working of the Press, the operation of the machine, composition and the process of binding. The Press Manager, Shri Laxmi Das, was kind enough to explain

the working under the guidance of our lecturer, Shri L. S. Shukla.

5. *Social & Cultural Activities*

Members of BHULSA also organised picnics and cultural activities. The arrangement of the boating and picnic through the Ganges was an interesting experience for the students which enabled members to have a closer understanding of one another.

6. *Study Tour*

The generosity and farsightedness of our Honorary Treasurer Shri J. B. Gupta gave us an opportunity to study the working of the various types of eminent libraries of the country. This is necessary for a librarian as it provides a study of the various types of an insight into the possible practical working problems of librarianship. A programme, therefore, has been chalked out to study the working of libraries.

7. *Games & Sports*

We were also not lacking behind in this direction. Activity on the sports ground was heartening. Large number of students won the prizes on the Annual Sports Day of the BHULSA. Students, staff and library personnel participated in a number of important events.

8. *Teachers' Day*

One of the special features of the year was the celebration of the 'teachers' day' which also happens to be the birthday of the President of our country. This gave us an opportunity to express our feelings and respect and faith in a teaching institution. Number of students viz., O. N. Mishra, B. S. Goswami, M.P. Agrawal, Rameshwar Roy. S. P. Mehta, P. K. Jaiswal and Michael David and a few other spoke on the occassion advocating the betterment and due recognision of teachers, because of their important role in shaping the society and the destiny of nation.

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CENTRAL HINDU COLLEGE, KAMACHHA

The Central Hindu College, Kamachha, despite its modest proportions, has an importance all its own. It has a direct, almost a living link with the past of our great University. Situated on the very ground where the old Central Hindu College once played a significant role in the regeneration of the country, this college enshrines the hallowed memory of Dr. Annie Besant and of a glorious experiment in national education.

The College now runs four distinct courses of study--the 1st. year of the Integrated courses in Technology, Pharmaceutics and Agriculture as also the Pre-Medical Course.

Brilliant students are admitted here from all parts of the country according to the quota of seats reserved for different zones. Every year a number of foreign students as well are admitted to the various courses of study in this College. In the current session the number of students on the rolls is five hundred and seventeen, including girl students and foreign students from countries like Thailand, Malayasia, Iraq etc. The three Kamachha Hostels, Dr. Annie Besant Hostel, King Edward Hostel, and the New Hostel—all close to the College and accommodating more than eighty percent of the student population provide a congenial atmosphere for fostering among the boarders a healthy, cosmopolitan spirit, in harmony with the ideal of international amity for which our country and our University stand.

The N.C.C. cadets of this College were chosen for presenting the guard of Honour to the President and the Prime Minister of India when they visited this University recently.

The performance of our students in the various University Examinations last year was as follows:

Agriculture	79.5	p.c.
Technology	81.5	p.c.
Pre-Medical	93	p.c.
B. Pharm.	94.7	p.c.

The latest of the many benefits enjoyed by our students is the award of 30 Merit-cum-Means Scholarships from the Govt. of India each of the value of Rs. 75/- per month.

In the Inter-College Debate arranged on the occasion of the Science College Annual Day, this year, the debating team of this College won the 'Malaviya Memorial Shield.'

The Scheme of the University Extension Lectures in the City which was introduced last year in this College has become an established institution and is growing increasingly popular.

The College Day was celebrated with Hon'ble Justice N. H. Bhagwati, the Vice-Chancellor of the University as Chief Guest. A short cultural programme was presented by the students of the College on the occasion. The Principal in his report among other things, referred to the special role of the College which serves as the foundation stage for initiating students into the higher orders of academic pursuits in some of the most important courses of study.

The Vice-Chancellor who was much impressed by the progress made by the College, spoke eloquently about the academic and extra-academic life of the College which had produced brilliant scholars like Padma-Bhushan Dr. Jayant Vishnu Narlikar.

REVIEW

Rūpaka Samīkṣā edited by Dr. E. R. Śrikirshṇa Śarmā, Śri Venkateśwara University, 1964, pp. 122, price : Rs. 4/-.

The present venture is the outcome of S. V. University Sanskrit Department Symposium No. 2 held in January, 1963. Besides the inaugural speech by the late MM. A. Shastri and a lecture by Pt. D. T. Tatacharya, the Rūpaka Samīkiṣā consists of seventeen papers concerned with Sanskrit drama and dramaturgy. It was a three-day seminar participated also by the teachers of the affiliated colleges of the University.

The present seminar is a definite improvement on the first seminar of which due notice had been taken (vide Prajñā Vol. IX(I) October, 1963). The contributors seemed to have acted according to a pre-conceived plan intended to embrace the different facets of the subject so as to marshall them into a coherent system. Description of details is matched with critical assessment. Barring the lectures of the veterans, the performance is on the whole satisfactory. The editor might have tried a little more to avoid duplication in some respects. The standard of printing is maintained.

The present work will go a long way to sustain the hope of the Vice-Chancellor, viz., the revival of the understanding of the old culture.

Dr. S. Bhattacharya

OBJECTS OF THE UNIVERSITY

1. To promote the study of the Hindu Shastras and of Sanskrit Literature generally as a means of preserving and popularizing, for the benefit of the Hindus in particular and of the world at large in general, the best thought and culture of the Hindus, and all that was good and great in the ancient civilization of India.

2. To promote learning and research generally in Arts and Sciences in all branches.

3. To advance and diffuse such scientific, technical and professional knowledge combined with the necessary practical training as is best calculated to help in promoting indigenous industries and in developing the material resources of the country: and

4. To promote the building up of character in youth by religion and ethics as an integral part of education.